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USSR Report

AGRICULTURE

No. 1268

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LIVESTOCK FEED PROCUREMENT

IMPROVING NUTRIENT QUALITY OF COARSE FEEDS

Moscow SEL'SKAYA ZHIZN' in Russian 16 Dec 80 p 2

[Article by K. Solntsev, director of VIZh [All-Union Scientific Research Institute of Livestock Breeding] and academician of VASKhNIL [All-Union Lenin Academy of Agricultural Sciences]: "Feed Quality and Productivity"]

[Text] In most places more coarse and succulent feed was procured than last year. Still many kolkhozes and sovkhozes have not increased the productivity of their herds.

What are the reasons for this? First of all there is the lack of full-value feeds and the poor utilization of mineral supplements and microelements. In the laboratories of VIZh an analysis was made of the content of the most important microelements in hay, haylage and silage. For the analysis samples of feed were taken from the enterprises of Podol'skiy Rayon, Moscow Oblast. It turned out that the hay that was procured this year contains less iron and cobalt than normal; haylage lacks some zinc, iron, and copper; and silage--cobalt. A violation of composition is characteristic of other rayons in the Non-Chernozem Zone as well. This decreases the digestibility of nutrients in feeds, has an unfavorable effect on protein and carbohydrate exchange, decreases resistance to various diseases and in the final analysis results in a drop in productivity. This is why during this winter period the role of balanced additives, especially of biologically active substances, increases. The best way to enrich rations and mixed-fodder is to prepare and use premixes of a special composition.

Scientists of the All-Union Institute of Livestock Breeding have developed a premix containing the salts of manganese, copper, zinc, iodine and cobalt as well as vitamins A, D_3 and E and tested it under production conditions. The premix contains microelements in the form of sulphates and chlorites and feed preparations of vitamins plus filler consisting of wheat chops or feed yeast.

The use of premixes in the rations of cows increases their productivity by 7-18 percent, improves their reproductive capability and enables us to curtail the service period. This is a result of the fact that the animal's metabolism becomes normalized, there is an increase of vitamins in the milk and colostrum and thus there is an increase in the vitality of calves.

Premixes are included in concentrated feeds. The daily dose of a premix for a lactating cow is 50-100 grams depending on productivity and 30-40 grams for dry cows. The cost of a daily dose of premix is 4-7 kopecks. Mixed fodder and feed mixtures that are enriched with premixes cannot be subject to thermal treatment (steaming, malting). The premix contains biologically-active substances and for this reason the aforementioned dose should not be exceeded.

In order to increase the biological full-value of rations it is possible to utilize not only premixes but also multi-component salt briquettes. Rations can be enriched with macro- and microelements directly in the feed shops of livestock farms. Satisfactory results have been achieved by including coniferous meal or fresh conifer branches in the ration. Let us remember that a kilogram of pine branches contains 0.069 milligrams of cobalt, 3.5 milligrams of copper, 159 milligrams of manganese, 15 milligrams of zinc, 2.3 grams of magnesium as well as 80-100 milligrams of carotene, 12.3 milligrams of protein, 4.6 milligrams of potassium and 1 gram of phosphorus. In nutritional value a kilogram of coniferous meal equals 0.37 feed units; of pine branches--0.23 and spruce branches--0.24 feed units. Coniferous meal can be utilized by large-horned cattle, sheep, hogs and birds. Adult large-horned cattle should receive 1-2 kilograms of meal, calves--0.3-0.5 kilograms, and hogs--50 grams per kilogram of feed; lambs and young calves--1 gram per kilogram of live weight; and poultry--1-2 grams daily.

Conifer boughs are ground up. The meal or flakes are added to concentrates or feed mixtures. Vitamin concentrates should not be steamed because carotene is destroyed in high temperatures. Conifers can be prepared until April. In the springtime substances appear that have a negative effect on the health of animals.

Summer and autumn rains affected the content of microelements as well as of protein, calcium, sugar and other nutrients in coarse and succulent feeds. This also must be taken into consideration when rations are composed and feed is prepared.

Some enterprises have forgotten about a careful attitude toward feed. Straw is stored under the open sky and feed is ruined because of increased moisture, frequent thaws and rainfall. Under such conditions it is essential to treat straw in the feed shop before feeding it to the animals. An effective and tested method for eliminating rot and warming up is the treatment of straw stacks with liquid ammonia--30 kilograms of ammonia per ton of straw. Treatment should continue no more than 10 days during negative atmospheric temperatures and 4-5 days during positive. It should be noted that straw with a moisture content of over 30 percent cannot be treated with ammonia. The subdivisions of Sel'khozkhimiya [Chemical association for agricultural enterprises] must make sure that the ricks are covered with a canopy for 4-5 days.

The ammonia treatment not only increases the longevity of the straw but also enriches the feed with protein and improves the digestibility of cellulose. This method is skilfully utilized by many kolkhozes and sovkhozes of the RSFSR, the Ukraine and Belorussia. In coming days we must sharply increase the pace of this work in order not to allow feed losses during storage.

An effective method for preserving straw and improving its quality is the processing of the straw into granules. Of course, a rotten mass cannot be processed into granules. Special attention should be given to supplying animals with sodium chloride. The reserve of sodium in the organism of a cow lasts only 45 days. After that a lack of salt in the diet affects milk productivity.

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LIVESTOCK FEED PROCUREMENT

UDC 636.085.55.022.2]:66.022.3:57.16

IMPORTANCE OF PROTEIN-VITAMIN ADDITIVES IN FEED

Moscow MUKOMOL'NO-ELEVATORNAYA I KOMBIKORMOVAYA PROMYSHLENNOST' in Russian
No 12, Dec 80 pp 13-15

[Article by A. Maznik, deputy director of Glavkombikorm [Main Administration for the Mixed Fodder Industry] of USSR Minzag [Ministry of Procurement]: "High Quality Protein-Vitamin Supplements for Agriculture"]

[Text] The party and state have always and continue to devote a considerable amount of attention to the development of the mixed-fodder industry. After the March 1965 Plenum of the CPSU Central Committee, the mixed-fodder industry in our country began to develop at a particularly rapid pace. Whereas in 1965 15.2 million tons of mixed fodder were produced, this year the figure should increase by a factor of 3.7.

Since 1966 the mixed-fodder enterprises of USSR Minzag have been rapidly increasing the production of the more valuable types of mixed fodder for poultry, piglets, large-horned cattle, and fish and they have been assimilating new types of products.

Following the initiative of the ITR [Engineering and technical personnel] of the Kiev Oblast Administration of Grain Products and the Vasil'kovskiy Combine of Grain Products, in 1966 the mixed-fodder shop of this enterprise made the transition to the production of protein-vitamin supplements. By the end of the year a new type of product was assimilated. This example was imitated by the Moldavian SSR Minzag--in 1967 the mixed-fodder shop of the Bel'tskiy Combine of Grain Products was reequipped for the production of protein-vitamin supplements.

In 1972 the production of premixes and specialized mixed-fodder for large livestock-raising complexes was assimilated; in 1975--the production of carbamide concentrates. During the period since 1965 there has been a significant growth in the production of mixed fodder in granulated form and especially of mixed fodder for poultry.

The organization of production of protein-vitamin supplements in state mixed-fodder plants has determined two directions in the development of mixed-fodder production. This was emphasized in a speech by the General Secretary of the CPSU Central Committee, Chairman of the Presidium of the USSR Supreme Soviet, Comrade L. I. Brezhnev, at the July 1970 Plenum of the CPSU Central Committee: "Evidently, it would be correct to follow two basic directions in the development of production of mixed-fodder. The first direction is the creation of state mixed-fodder plants. They must produce full-value mixed-fodder basically for large specialized poultry-raising and hog-raising enterprises. We must increase the capacities of such enterprises in every possible way. At the same time we should organize the production of protein-vitamin supplements and premixes there for sales to kolkhozes and sovkhozes."

"The second direction is the production of mixed fodder in kolkhozes and sovkhozes using their own grain and commercial supplements..."

Life has confirmed the progressive nature of this direction in the development of the mixed-fodder industry.

A great advantage to the organization of mixed-fodder production in kolkhozes and sovkhozes is the increase in the effectiveness of utilizing forage grain amounting to 10-20 percent. Another advantage is the curtailment of inefficient shipments of grain and mixed fodder. In order to increase the effectiveness of utilizing existing grain forage supplies in enterprises, the directives of the 24th CPSU Congress concerning the five-year plan for the development of the national economy of the USSR in 1971-1975 called for an increase in the production of protein-vitamin supplements to 1 million tons by 1975 in the enterprises of USSR Minzag. The USSR Ministry of Agriculture and the councils of ministers of union republics were assigned the organization of mixed-fodder production in kolkhozes and sovkhozes on the basis of protein-vitamin supplements and utilizing grain that was available in the enterprises themselves.

As a result of the measures that were taken in 1975 the enterprises of USSR Minzag produced and delivered to agriculture 1,461,000 tons of protein-vitamin supplements. During the Ninth Five-Year Plan as a whole 3,293,000 tons of protein-vitamin supplements, or 100.2 percent of the plan, were produced. During the 10th Five-Year Plan (4 years and 6 months) the production of these supplements increased significantly and comprised 9,705,000 tons, or almost triple the amount for the Ninth Five-Year Plan.

The Ministry of Procurement of the Ukrainian SSR has been dealing successfully with the goal of producing protein-vitamin supplements--during 4 years and 9 months of the current five-year plan 5,064,000 tons of protein-vitamin supplements have been produced, as compared to the planned 5,050,000 tons.

In the Ukrainian SSR in 1979 interfarm, kolkhoz and sovkhoz mixed-fodder enterprises produced over 8 million tons of mixed fodder on the basis of protein-vitamin supplements, which enabled them to efficiently utilize about 6.5 million tons of grain and to achieve a savings of 1 million tons of grain.

The mixed-fodder enterprises of the Moldavian SSR Ministry of Procurement are achieving good and stable results in fulfilling plans for the production of protein-vitamin supplements. In 4 years and 9 months of the Ninth Five-Year Plan they produced 571,600 tons of protein-vitamin supplements as compared to the planned 559,000 tons. This is the work primarily of the collective of the Bel'tskiy Combine of Grain Products, which has been constantly improving its technology since the mixed-fodder shop with a capacity of 130 tons per day was converted for the production of protein-vitamin supplements in 1967 and which in 1980 increased the capacity of the shop to 300 tons per day by means of a series of renovations.

Success is being achieved in the program for producing protein-vitamin supplements in the enterprises of the ministries of procurement of the Lithuanian SSR (164,600 tons compared to the planned 162,000 tons), Latvian SSR (114,000 and 111,000 tons respectively), Kirghiz SSR (80,000 and 67,500 tons respectively) and others.

The enterprises of the Ukrainian SSR Ministry of Procurement and the enterprises of other republics have organized the production of protein-vitamin supplements in granulated form. This form of production is very progressive. It enables us to avoid the labor-consuming operations of packing into bags, to achieve a savings in expensive packaging, to simplify the technology of producing mixed-fodder using protein-vitamin supplements in enterprises and to significantly curtail losses of products during shipment and during the production process.

At the same time, with the seemingly favorable situation, in most republics the plan for the production of protein-vitamin supplements is not being fulfilled in the mixed-fodder industry as a whole. During 4.5 years of the current five-year plan the plan was fulfilled by only 82 percent. For agriculture this meant an undersupply of 2,161,000 tons of protein-vitamin supplements. How is this explained? An analysis shows that in the RSFSR a significant portion of non-grain raw materials allocated for the production of protein-vitamin supplements is used for the above-plan production of mixed-fodder for poultry. Thus, in 4.5 years of the 10th Five-Year Plan 2.8 million tons of this type of mixed fodder was produced. The situation is complicated by the fact that there is still a problem with the balance of raw materials for the production of the planned mixed fodder and protein-vitamin supplements. The mixed-fodder industry receives insufficient supplies of protein raw materials. The allocations of vitamins B_4, B_5, D_3, K and C, of iron sulphate, manganese salts, metionin and lysin are inadequate.

However, this does not exhaust by far the shortcomings in the organization of the production of protein-vitamin supplements. There are justifiable complaints with regard to the assortment of produced protein-vitamin supplements against the mixed-fodder enterprises of USSR Minzag. Thus, protein-vitamin supplements are produced mainly for hogs and cattle and not for poultry.

There are cases in which quality indicators are below normal, especially as concerns raw protein. There are violations of the size of the particles and of the recipes.

Some mixed-fodder enterprises are not making the transition to the production of protein-vitamin supplements because this means a drop in productivity. This applies primarily to the enterprises of RSFSR Minzag, where there is a shortage of production capacities to produce the planned volume of mixed-fodder and protein-vitamin supplements.

There are also complaints against the users of protein-vitamin supplements. Thus, for a number of years the RSFSR Ministry of Agriculture has not been providing multiple purchase orders for the sale of protein-vitamin supplements directly for the production of mixed fodder in interenterprise mixed-fodder plants. Thus, in 1978 with a production plan of 1,200,000 tons multiple purchase orders from the RSFSR Ministry of Agriculture comprised 740,000 tons of protein-vitamin supplements; in 1979--1,500,000 and 148,000 tons respectively. During the first half year of 1980 with a plan of 900,000 tons the RSFSR Ministry of Agriculture filled multiple purchase orders directly for 575,000 tons of protein-vitamin supplements; and in the third quarter--only 2,000 tons of the planned 450,000 tons.

As a result of all these shortcomings the plan for the production of protein-vitamin supplements by the RSFSR Ministry of Procurement has not been fulfilled for the 4 years and 9 months of the 10th Five-Year Plan. Only 3,189,000 tons of protein-vitamin supplements of the planned 5,740,000 tons, or only 56 percent of the total, were produced. The plans for protein-vitamin supplements are not being fulfilled by the ministries of procurement of the Kazakh SSR and the Azerbaijan SSR, and the Ministry of Procurement of the Uzbek SSR has not even begun to produce these supplements although its production goal is 7,500,000 tons of protein-vitamin supplements.

All of this in turn has a negative effect on the pace of work of interfarm, sovkhoz and kolkhoz mixed-fodder enterprises and on their fulfillment of production plans for the output of mixed fodder on the basis of protein-vitamin supplements.

In order to successfully meet the goals for producing protein-vitamin supplements it is essential to study the questions of distribution and the future development of interfarm, kolkhoz and sovkhoz enterprises, their capacities in every republic, oblast and kray in order to maximally curtail the shipment of protein-vitamin supplements from state mixed-fodder plants to these enterprises. Here we should consider that the radius of shipments of protein-vitamin supplements to interfarm and other enterprises should be within the parameters of 100 kilometers.

It is essential to know the direction of development of livestock raising, its mixed-fodder requirements, the level of development of the grain industry, including of forage crops in the given region.

As practical experience has shown, in most union republics it is expedient to produce protein-vitamin supplements in existing mixed-fodder plants. With the utilization of a large network of mixed-fodder industries this type of production organization will enable many oblasts and grain regions in particular to produce the necessary quantity of the needed assortment of protein-vitamin supplements at any time according to orders (in accordance with funds) from interfarm and other enterprises.

In order to retain daily productivity in mixed-fodder plants while producing vitamin-protein supplements it is essential to complete the necessary renovation work, which included strengthening the capacities of individual technological lines. For example, the productivity of the technological line for feed products from foodstuffs must secure 58 percent of the daily productivity of the plant; the line for oilcakes and oil-seed meal--40 percent; and mineral raw materials--12 percent. The technological line for premixes and grass meal must be expanded by a factor of 5-6. This is a result of the nature of ingredients that comprise protein-vitamin supplements, which consist primarily of these types of raw materials, on the one hand and on the other--of the relationship of protein-vitamin supplements to grain during processing, a ratio of 1:5 or 1:6.

In order to calculate the aforementioned technological lines depending upon the capacity of the enterprise the following formula should be utilized: $M_{1,2,3} = \sum \Pi \cdot t \cdot K$ tons per day, where M_1 is the productivity of the technological line of feed products from foodstuffs, which must equal 58 percent of the capacity of the mixed-fodder enterprise (M); M_2 is 40 percent of M; M_3 is 12 percent of M, etc.; $\sum \Pi$ is the total productivity of parallel operating machinery in the technological line for which the capacity is being calculated (tons per hour); t is the duration of operations of the line per day (24 hours); K is the use coefficient of the equipment (0.9).

Over 10 years of experience have proven the expendiency of organizing the production of mixed fodder using protein-vitamin supplements and the grain belonging to kolkhozes and sovkhozes. It is the goal of the collectives of mixed-fodder enterprises of the USSR Ministry of Procurement to secure the delivery of high-quality protein-vitamin supplements to interfarm and intrafarm mixed-fodder enterprises on schedule and in the required quantities.

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FATTENING HORSES CAN INCREASE MEAT PRODUCTION

Tashkent EKONOMIKA I ZHIZN' in Russian No 11, Nov 79 p 52

[Article by D. Kholmirzayev, graduate student at the Samarkand Agricultural Institute: "Horse Raising Can Be Profitable"]

[Text] A great deal is being done in our republic for the development of public animal husbandry. Carrying out the decisions of the 25th party congress and subsequent plenums of the CPSU Central Committee, the workers of the kolkhozes, sovkhozes, and interfarm organizations increased the production of meat by 22 percent, milk by 31 percent, and eggs by 51 percent in the first three years of the current five-year plan compared to the Ninth Five-Year Plan.

But even more must be done in the coming years in furtherance of the recent decree of the CPSU Central Committee and USSR Council of Ministers entitled "Steps To Accelerate the Development of Animal Husbandry in the Uzbek SSR." The jobs of republic party organizations in fulfillment of this decree were outlined by the 14th Plenum of the Central Committee of the Uzbek Communist Party, which also designated the goals that animal husbandry should attain in 1985. The production of meat at all categories of farms is to be raised to 740,000 tons, 48 percent more than in 1978, while milk production will be increased to 2.9 million tons, which is 45 percent more than last year, and 2.68 billion eggs will be produced, double the achieved level.

All the reserves for production of meat and other animal husbandry output will have to be put to use to carry out the vast program of improvement in animal husbandry developed by the Central Committee of the Uzbek Communist Party and the republic government.

One of these reserves, in our opinion, is raising horses in the semidesert and foothill zones of the republic. This matter is not receiving adequate attention at the present time and, therefore, the number of horses is not growing. In comparison with 1965 it has even declined. The total horse meat produced at all categories of farms is only about 3,000 tons.

Horse raising remains a traditionally unprofitable sector of animal husbandry. This is only because most farms sell horses for slaughter without fattening and feeding them out first. As a result, the average selling weight of horses at kolkhozes is 283 kilograms and at the sovkhozes it is even less, 268 kilograms.

The experience of leading farms in the foothill zone shows, however, that with good fattening during the spring and fall the meat-milk productivity of horses can be raised significantly while at the same time the prime cost of a unit of output is reduced.

Our experiments at the State Biological Station in Kushrabadskiy Rayon of Samarkandskaya Oblast confirmed that with good fattening a young horse up to two years of age can achieve daily weight gains of 900-1,000 grams without supplementary feeding, while for mature horses a figure of 800-900 grams is feasible. After 70 days of spring fattening the young animals produced an average of 60 kilograms of gain a head, while the mature horses gained an average of 51 kilograms.

After fattening the farm sold the state young animals with a live weight of 265 kilograms a head and mature horses up to 421 kilograms. The cost of the State Biological Station for fattening (not including pasture grass) was 7.5 rubles a head for young animals and 10.9 rubles for mature horses. The prime cost of a quintal of weight gain received during the fattening period was 11.2 rubles for young animals and 18.5 rubles for mature horses.

Costs for maintenance and feed increased markedly when horses were fed out during the winter, and the average daily gain dropped slightly. Nonetheless, feeding out horses helps increase the production of horse meat and the profitability of horse raising. As a result the State Biological Station in Kushrabadskiy Rayon sold the state young animals with a live weight of 230 kilograms a head and mature horses at 370 kilograms.

Figured per quintal of meat in live weight the farm received 60.9 rubles of profit per young animal and 41.4 rubles from the mature horses.

Thus, fattening and feeding out horses is a major reserve for increasing the production of horse meat. All the farms of the foothill and semidesert zones have realistic opportunities to increase the production of high-quality output and change horse raising from a traditionally unprofitable sector to a highly profitable sector.

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LIVESTOCK

TESTS SHOW GOOD HORSE CARCASSES PRODUCED BY FALL FATTENING

Tashkent SEL'SKOYE KHOZYAYSTVO UZBEKISTANA in Russian No 8, Sep 80 p 29

[Article by D. Kholmirzayev, graduate student at the Samarkand Agricultural Institute: "Fall Fattening of Karabair Horses"]

[Text] A series of special tests was organized to establish the efficiency of fall fattening of Karabair horses kept under herd conditions in the foothill pastures of Uzbekistan. The studies were made with groups of animals of different age and sex at the state biological station of Koshrabadskiy Rayon of Samarkandaskaya Oblast for a period of 54 days (16 September to 9 November 1978).

For the experiment we selected 50 animals which were put in two groups of 25 head. The first group was made up of two-year-old colts, while the second group comprised 10-15-year-old mares.

The animals were selected by the principal of analogs. The average live weight of the colts was 221 kilograms, while the mature mares averaged 339 kilograms. The horses in both groups were of average fatness.

During the fattening period the horses were in the pasture for an average of 17 hours a day and ate only pasture grass. They were watered three times a day with mountain spring water. The pastures were changed every 5-6 days during the fattening period.

As a result of the fall fattening the average live weight of the young animals at the end of the experiment was 255 kilograms, while the mature mares averaged 369.9 kilograms. In other words, the weight gains were 34 and 30.9 kilograms respectively. The average daily weight gain was 630 grams in the first group and 565 grams in the second. By the end of the experiment all the test animals were in a high state of nourishment (fattening).

The fattening was most intensive between 25 September and 25 October, when the average daily gain was about one kilogram.

At the end of the fattening process three horses from each group were specially slaughtered at the Samarkand Meat Combine using the All-Union Scientific Research Institute of Animal Husbandry in order to study their meat productivity.

The information obtained is presented in Table 1 below.

Table 1

Indexes	Young Animals	Mature Animals
Live Weight Before Slaughter, kg	243	349
Level of Nourishment	highest	highest
Weight of Carcass, kg	131.7	192.7
Weight of Internal Tallow, kg	3.2	6.4
Slaughter Weight, kg	134.9	199.1
Slaughter Output, kg	54.2	55.3
Weight of Hide, kg	10	16

As Table 1 shows, the horses had good meat productivity after fattening. The indexes in the mature horse group were slightly better than for the young animal group.

The morphological composition and grade of the carcasses according to the trade network system was studied to get a full characterization of meat productivity (see Table 2 below).

Table 2. Morphological Composition and Grade of Carcasses of Test Animals

Grade of Meat	Weight of Offal, kg		As Percentage of Carcass	
	Young Animals	Mature Animals	Young Animals	Mature Animals
Regardless of grade, "kaza"	10.1	16.9	7.8	8.9
"Zhal"	0.9	1.3	0.69	0.69
Grade I	61.8	91.1	47.6	48.1
Grade II	49.8	72.5	38.4	38.2
Grade III	7.2	7.2	55 [sic]	4.1

The figures in the table show that the test horses produce high-quality carcasses after fall fattening. The output of grade I meat was quite high for both groups of animals. With greater age the percentage of low grades declines and the output of "kaza" and "zhal" increases accordingly.

On the basis of our experiments we recommend that fall fattening of both young horses and mature mares no longer suitable for reproduction be organized in the foothill zone of the Nuratinskiy hills to obtain full-value, good-quality horse carcasses.

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LIVESTOCK

GIVE GREATER ATTENTION TO HORSE RAISING IN KAZAKHSTAN

Alma-Ata SEL'SKOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 7, Jul 79 pp 26-27

[Article by M. Akhmetniyazov, director of the Znamenskiy Sovkhoz in Semipalatinskaya Oblast: "Why Are Horses in Disfavor?"]

[Text] Horse raising as well as sheep raising is a highly developed, profitable sector of animal husbandry in our oblast. The oblast is the republic leader in number of horses. Our kolkhozes and sovkhozes have more than 90,400 horses, including 24,900 reproducing mares. By 1980 the number of horses is to rise to 110,000 head, and reproducing mares will be 35 percent of this herd.

Meat has been and is today the important output from horse raising. All 119 farms in the oblast sell horse meat to the state. In 1971-1978 they sold 10,600 tons of horse meat, but this is just 1.5 percent of the total meat balance of the oblast. Why is it so little?

In our oblast horses are maintained in herds. This makes the work of the herdsmen easier, of course, and entails fewer material expenditures and almost no feed costs. But we believe that this kind of maintenance is an extensive form which cannot ultimately be considered satisfactory for the growth and development of the herd and increasing horse productivity.

In speaking of the potential of horse raising, let us recall that at the present time the kolkhozes and sovkhozes of the oblast have hundreds of thousands of hectares of pastureland that they are not fully using. This could be a reliable feed base for herds of horses. It would make it possible to obtain inexpensive output with insignificant labor and material expenditures. Calculations show that 36,000 tons of feed units remain unused on pasture lands at the farms of Abayskiy, Aksuatskiy, and Chubartauskiy Rayons alone. This is enough to maintain 18,000 horses. In other words, it is possible to obtain an additional 1,250 tons of meat and 72 tons of milk worth 1.5 million rubles at state purchase prices.

Where should we begin? In the first place, development of the sector should follow the path of further specialization and concentration.

Purposeful breeding work is an important reserve for raising the productivity of horses. The farms of the oblast raised 608 purebred colts in the years 1971-1978. This is a very small number and permits us to conclude that horse raising at present is not being done systematically, that the individual farms have not set up animal record-keeping and are not evaluating the animals by the quality of their offspring.

The development of horse raising is inhibited by the mistaken belief that the sector has no future, that it is economically unwise for farms to specialize in raising horses. The agencies of the Central Statistical Administration have improperly forgotten horse raising by excluding the production of horse meat and kumyss from operational reporting, even though it is now essential to encourage the development of industrial feedlots for horses.

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NEW FLY-BLOODSUCKING INSECT REPELLENT SUCCESSFULLY TESTED

Krasnodar SEL'SKIYE ZORI in Russian No 6, Jul 80 p 56

[Article* by Yu. Rastegayev, senior scientific association of the All-Union Scientific Research Institute of Veterinary Entomology and Arachnology of VASKhNIL: "Against Flies and Bloodsucking Insects"]

[Text] Farms use Creolin, Lysol, a Lysol-turpentine mixture, hexachloran, and other chemicals to protect horses against bloodsucking insects. But these means of protection are not effective enough. As the experience of the Krasnaya Zvezda and imeni XXII Parts"yezda kolkhozes in Morshanskiy Rayon of Tambovskaya Oblast indicates, a mixture prepared from a three percent emulsion of benzamin, a 0.5 percent alkali solution of chlorofos, and OP-7 emulsifier produces much better results. The farms treated their horses in a pen 40 meters long and 15 meters wide using special DUK and LSD machines and 1-1.2 liters of the mixture per animal. The liquid was applied in a fine spray and protected the animals against large-scale attack by horseflies for 3-5 days.

The mixture produced satisfactory results in protecting horses against mosquitoes. It did not cause any local reactions of the skin and mucous membranes, and clinical examination of the animals found no impairments of general physical condition.

The preparations were tested for two months in remote pasture conditions also. The increase in live weight demonstrates their efficiency. Animals treated with the repellant mixed with insecticide gained an average of 37 kilograms in two months while the control animals gained only 19 kilograms. When the animals were slaughtered it was found that the entire control group was infected with intestinal fly larvae while just 10 percent of the treated animals were.

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* For similar material see JPRS 75958/11239 of 30 June 80, pp 106-107.

AGRO-ECONOMICS AND ORGANIZATION

PROSPECTS FOR AGRICULTURAL PRODUCTION IN LITHUANIAN SSR REVIEWED

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 1, Jan 81 pp 102-105

[Article by R. Songayla, secretary of the Central Committee of the Communist Party of Lithuania: "Prospects for Development of Agricultural Production in the Republic"]

[Text] The principal goal of the agrarian policies of the CPSU is that of transforming agriculture into an intensive and highly developed sector of the country's economy.

The March (1965) Plenum of the CC CPSU was aimed at achieving this goal. It provided the foundation for the new agrarian policies, which were further enriched and further developed during subsequent party congresses and plenums of the CC CPSU and in reports and speeches by the general secretary of the CC CPSU and chairman of the Presidium of the USSR Supreme Soviet L.I. Brezhnev.

The republic's party organization is directing all efforts towards the implementation of measures for achieving all-round development for agriculture. First of all, the logistical base for agriculture is undergoing constant strengthening, while at the same time mechanization, land reclamation and the use of chemical processes are being carried out. During the Tenth Five-Year Plan alone, capital investments in agriculture throughout the republic amounted to roughly 3.4 billion rubles. During the years of the Tenth Five-Year Plan, our farms were supplied with 24,200 tractors, 6,600 grain harvesting combines, 11,400 trucks, many other items of agricultural equipment and an annual average of 2.1 million tons of mineral fertilizers.

An important factor in the intensification of agricultural production in Lithuania is that of land reclamation. A powerful production base has been created in the republic for the land reclamation organizations, which annually drain 120,000 hectares. At the present time, the area of intensively drained land amounts to more than 2 million hectares. More than 700,000 hectares of highly productive cultivated haying and pasture land and 66 percent of the grain fields are disposed on this drained land.

In the party's agrarian policies, a great amount of attention is focused on improving those economic relationships which serve to develop interest among the farms and all rural workers in increasing the production of crop husbandry and livestock husbandry products. Here an important role has been played by the use of a differentiated approach with regard to the work being carried out by the farms and especially in connection with the use of economic levers. This has made it possible to smooth out the economic conditions of management. As a result, many farms in all zones and rayons throughout the republic achieved high levels of production development and fine economic indicators.

With the development of the productive forces in the rural areas, new forms for the organization of production operations appeared, in particular specialization and concentration based upon interenterprise cooperation and agro-industrial integration. Appropriate measures were planned in this regard during the 17th Congress and 19th Plenum of the Central Committee and Communist Party of Lithuania. Thus, a number of kolkhozes and sovkhozes were consolidated based upon regional planning systems. Two hundred and thirty territorial interenterprise associations were created. Specialized farms were established for the growing of technical crops, vegetables, potatoes and fruit. A network of seed production farms was created for the cultivation and propagation of high quality seed for grain crops, perennial grasses, spinning flax and potatoes. Improvements are being realized in the provision of agro-chemical services for agriculture.

Definite successes have also been achieved in the area of specialization and concentration in livestock husbandry, which is being converted over to an industrial basis. A great amount of work is being carried out throughout the republic in connection with the construction of livestock husbandry complexes and the modernization of old production buildings, taking into account the particular type of specialization at each farm. Leading production technologies are being introduced into operations at these farms and working conditions are being improved radically. At the present time, there are 410 dairy complexes in operation, each maintaining 400 or more cows, 29 hog raising complexes, two complexes for the fattening of long-horned cattle and five poultry factories.

During the process of implementing the program for production specialization and concentration, many farms converted over to the branch and other more improved forms and methods of production control. This enabled the farm leaders and specialists to solve their production problems in a more efficient, effective and creative manner.

The new changes in the organization of agricultural production have accelerated considerably the economic and social processes in the rural areas. Networks of production centers, machine yards and housing settlements are being created in a systematic manner. Rational plans for the placement of general educational schools and childrens' pre-school, medical, cultural, trade, domestic and athletic institutes have been developed and are being implemented. More than 30,000 new apartment houses were built in the rural areas by means of cooperative and individual construction during the years of the Tenth Five-Year Plan and more than 40,000 families were resettled from farmsteads. Already, 40 farms throughout the republic do not have farmsteads on their own lands.

At the same time, in conformity with the party's agrarian policies, a great amount of attention is being given to developing the entire agro-industrial complex and to improving production-economic collaboration between agriculture and those industrial branches which are directly associated with it. For example, new combines have been built -- Utyanskiy and Alitus meat combines, Kaunas dairy combine, Kapsukas Combine for Canned Dairy Products and others. The modernization and expansion of production capabilities are being carried out at almost all of the meat combines and dairy enterprises. The capabilities at factories engaged in the processing of flax products have been increased considerably. Conditions have been created for processing an entire flax crop right up until the next harvest. Measures are also being taken to increase the capabilities of sugar plants and other enterprises which are either servicing agriculture or processing its products.

For the purpose of intensification of agricultural production, a great amount of work is being carried out on the republic's farms in connection with improving the culture of farming and livestock husbandry. Constant improvements are being carried out in the agricultural practices being employed at the kolkhozes and sovkhozes, greater quantities of organic fertilizer are being accumulated and better use is being made of mineral fertilizers. Scientific and engineering achievements and leading experience in raising the fertility of soils are being introduced into operations in all areas and this is promoting increases in the cropping power and gross yields for all agricultural crops.

Special attention is being given to grain production in terms of increasing the cropping power and expanding the growing areas for these crops. During the years of the Tenth Five-Year Plan, the average cropping power for the grain crops was 23.6 quintals per hectare, or 0.7 quintals more than the average for the Ninth Five-Year Plan. During a year considered good in terms of climatic conditions, the cropping power for the grain crops reaches more than 29 quintals per hectare. The average annual level for grain production during this period was 17 percent greater than the average annual level for the Ninth Five-Year Plan.

The growth in the production of grain and other farming products is making it possible to strengthen the feed base on a regular basis and this is creating favorable conditions for the development of livestock husbandry -- the republic's principal branch of agriculture -- and for increasing the procurements of livestock husbandry products. During the years of the Tenth Five-Year Plan, the average annual level of milk production at kolkhozes and sovkhozes, compared to the Ninth Five-Year Plan, increased by 16 percent, meat (in live weight) -- by 20 and eggs -- by 48 percent. At the present time, roughly 140 kilograms of meat (in dressed weight), 790-830 kilograms of milk and almost 280 eggs are being produced per capita in the republic for all of agriculture.

Growth in livestock husbandry output is being achieved based upon intensive fattening of the livestock and poultry and constant increases in their numbers. During 4 years of the Tenth Five-Year Plan, an annual average of 3,256 kilograms of milk was obtained from each cow on farms in the public sector. This figure was greater by 135 kilograms than the average for the Ninth Five-Year Plan. The average daily increase in weight for long-horned cattle undergoing fattening amounted to an average of 708 grams and for hogs undergoing fattening -- 450 grams. Young long-horned cattle stock were sold to the state at an average weight of 403 kilograms.

There are many farms throughout the republic where, owing to the skilful combining of all factors associated with the intensive development of livestock husbandry, rather high indicators have been achieved in the production of milk and meat. For example, in 1979, notwithstanding the fact that livestock productivity had fallen owing to unfavorable weather conditions and a shortage of feed, 10 farms throughout the republic each produced 1112-1439 quintals of milk for every 100 hectares of agricultural land. Their number included the training farms of the Lithuanian Veterinary Academy (Kaunasskiy Rayon), the Kolkhoz imeni Chernyakhovskiy in Kapsukskiy Rayon, the Tayka Kolkhoz in Shakyayskiy Rayon and others. On these farms, the average milk yield per cow reached 4368-4865 kilograms annually.

The Kolkhoz imeni I. Bilyunas in Kaunasskiy Rayon achieved very fine results in its production of meat. It produced 490 quintals of meat for every 100 hectares of agricultural land. The Kolkhoz Ligumay in Kapsukskiy Rayon -- 468 quintals and the Shaukotas Kolkhoz in Radvilishkskiy Rayon -- 395 quintals. Approximately 50 farms throughout the republic produced more than 200 quintals of meat for every 100 hectares of agricultural land.

Improvements have been realized in the culture of livestock husbandry operations as a result of its conversion over to an industrial basis. On farms having high levels of all-round mechanization of work processes and fine conditions for work and for the maintenance of livestock, fine economic indicators are being achieved by the personnel. The collective at the interenterprise Shirvint Hog Raising Enterprise in Shirvintskiy Rayon is constantly achieving great successes. This enterprise, which has a capability for handling 15,000 hogs annually, sold 10,350 head of hogs representing an overall weight of 10,709 quintals to the state during the first 6 months of 1980 alone. The average daily weight increase for hogs undergoing fattening is 618 grams and feed consumption per quintal of weight increase -- 5.4 quintals of feed units. Fine work is also being performed at the hog raising complexes of the Kolkhoz imeni Michurin in Kaunasskiy Rayon, the Taribu Letuva Kolkhoz in Kapsukskiy Rayon and others.

Even greater achievements were realized by certain other leading livestock husbandry farms and workers. Laureates of the Republic Prize of the Lithuanian SSR, milkmaids L. Bakanauskene and L. Meldaykene at the Pirmin Kolkhoz in Shaulyayskiy Rayon, vowed to obtain milk yields of 3,090 tons of milk during the five-year plan. This high obligation has already been fulfilled. Laureate of the Republic Prize of the Lithuanian SSR, herdsman A. Nauyavichyus at the Lenino Presakay Kolkhoz in Shal'chininkskiy Rayon is achieving a 1 kilogram weight increase daily in his long-horned cattle. A hog tender at the Aniktsye Shilyalis Kolkhoz in Aniktsyayskiy Rayon, communist V. Adomonis, vowed to raise 5,200 hogs of bacon condition during the five-year plan. By 1 October 1980 he had already raised 5,420 hogs.

There are presently many leading livestock husbandry workers on the farms who have kept their promises in an honorable manner and successfully completed the Tenth Five-Year Plan.

The development of cattle breeding farms is promoting fine results in livestock husbandry. There are presently 33 breeding farms for long-horned cattle in the republic, 32 for hog raising operations and one for sheep raising and also one zonal experimental station for poultry raising operations. On the average, these facilities raise and supply to other farms throughout the republic, on an annual basis, 2,000 head of long-horned cattle for herd restoration purposes, 20,000 head of young pedigree hogs and 300,000 head of young poultry stock.

A great amount of attention is being devoted throughout the republic to the production of livestock husbandry products in the private sector. Taking into account the natural opportunities available to rural workers, tracts of land are being made available for the grazing of cattle and for hay making purposes. In addition, mixed feed is being furnished to the population for products sold to the state. Each year the farms are increasing their sales to the population of young pigs and young poultry stock. Compared to 1975, when 2.37 million yead of young poultry stock and 201,000 head of young pigs were sold to the population, by 1979 the figures had risen to 4.14 million and 549,000 respectively. In 1979, the state obtained 550,000 tons of milk and 72,000 tons of meat from the private plots, or 27 percent and 12 percent respectively of the overall procurements of these products. Moreover, the requirements of the families of kolkhoz members and sovkhoz workers for livestock husbandry and poultry raising products are being met to a certain extent.

The use of an all-round approach in solving all of the agricultural problems is bringing about steady agricultural development and new successes. Despite the fact that the past 3 years were characterized by extremely unfavorable weather conditions, the average annual volume of gross agricultural output for the republic during the years of the Tenth Five-Year Plan, compared to the average annual level for the Ninth Five-Year Plan, increased by 17 percent on farms in the public sector.

However, the level of agricultural development is still not in keeping with modern requirements. Energetic effort is required in order to strengthen the logistical base for agriculture, improve production organization and raise its efficiency.

The republic's party organization, in implementing the decisions handed down during the July (1978) and November (1979) Plenums of the CC CPSU, is devoting a great amount of attention to the problems associated with the intensification of agricultural production. But here there are many unresolved problems. One such problem is that of growth in fixed capital of both productive and non-productive nature. At the present time, 21 percent of the long-horned cattle and 12 percent of the hogs are still being maintained in temporary facilities.

The farms are not being adequately supplied with grain storage facilities, warehouses for potatoes, root crops and vegetables or with motor vehicle garages. The level of all-round mechanization at livestock husbandry farms must also be recognized as being unsatisfactory. Thus a great amount of work must be carried out in the interest of introducing a complex of measures aimed at strengthening the logistical base of the farms, expanding the construction of new farms and carrying out the modernization of old production facilities, while equipping them with all-round mechanization and progressive production technologies.

Land reclamation facilities constitute a large portion of the fixed capital of kolkhozes and sovkhozes. And in the future land reclamation work will continue to be an important sector of work. At the beginning of 1980, there were approximately 1 million hectares of land requiring drainage. This work must be completed over the next 10 years.

The irrigation of pastures and vegetables out on open ground holds great promise for the future. Irrigation systems have been installed on 24,500 hectares of land throughout the republic. Over the next few years, our task will consist of providing irrigation for all vegetables being grown out on open ground and expanding the construction of land reclamation-irrigation installations on cultivated meadows and pastures. At the same time, a requirement will exist for achieving proper utilization of each reclaimed hectare of land, since in some rayons the increase in yield being obtained from drained land is still low.

In the interest of achieving more complete satisfaction of the requirements of livestock husbandry for high quality feed, constant work is being carried out throughout the republic aimed at increasing the production of grain and forage crops and improving the feed procurement technologies and also the feed storage operations. For example, in 1980 grain crops were already being grown on 52 percent of the overall area under crops. The areas used for alfalfa and other pulse crops are also being expanded and the productivity of all forage crops is being raised.

At the same time, the production of protein feed is being increased annually at industrial enterprises throughout the republic. In supplying livestock husbandry with high quality feed, a great role is played by the mixed feed enterprises of the republic's Ministry of Procurements.

However, notwithstanding the measures undertaken to increase the production of feed and improve its quality, livestock husbandry is still not being supplied adequately. In particular, this is being reflected in shortages of protein and other components. Thus the protein problem will continue to be a very serious one in the future. In addition to expanding the growing areas for pulse crops and increasing their cropping power, the production of the protein component on an industrial basis should ideally be expanded.

In solving the problem of feed production and raising its quality, a great amount of attention is presently being focused on raising the cropping power of all forage crop lands. And this is possible only upon the condition that adequate amounts of fertilizer are made available. A great amount of work is being carried out in this regard: the accumulation of organic fertilizers is being increased and mineral fertilizers are being utilized in a more rational manner. Whereas at the present time 8 tons of organic fertilizers are being applied per hectare of arable land annually, in the future -- no less than 10 tons.

However, more mineral fertilizer is constantly required for forage lands and crops. Nevertheless, almost no increase has taken place in the supplies of such fertilizer in recent years. Thus it is not possible to provide the forage crop lands with such fertilizer in accordance with the scientific recommendations, despite the fact that a mineral fertilizer top dressing represents a principal condition for increasing the feed supplies, lowering the production costs for feed and further improving the utilization of land areas. The achieving of a substantial increase in the cropping power of forage crops and particularly perennial grasses and cultivated meadows and pastures will make it possible to reduce their growing areas accordingly and, as a result, expand the plantings of other important crops, mainly grain crops. We are channeling all of our efforts in this direction.

Equipment plays a major role in modern agricultural production. The republic's rural workers are devoting a maximum amount of effort towards ensuring the rational and efficient use of their equipment and more all-round mechanization of operations, especially on livestock husbandry farms and in feed production work. But here a very great problem continues to be that of supplying the farms with powerful tractors, tractor-drawn implements, self-propelled mowers and other equipment. In particular, a special requirement exists for highly productive feed production equipment. The motor transport fleet also requires renovation, especially with special purpose machines for agriculture.

The services provided by enterprises and organizations of the republic's Goskomsel'khoztekhnika exert a great influence with regard to increasing agricultural production and improving the working conditions of the farmers. The volume of work being performed by these enterprises and organizations is increasing and improving with each passing year. Thus measures are being undertaken to strengthen and expand the logistical base of Goskomsel'khoztekhnika. New forms are being sought for providing services for the kolkhozes and sovkhozes and for utilizing the leading experience of other republics. All of these factors are serving to promote growth in the level of agricultural production.

Interenterprise cooperation and, it follows, production specialization, concentration and industrialization require further development. At the beginning of this year, during a meeting of the republic's aktiv, a discussion was held on the problems associated with intensifying specialization and concentration in agricultural production and developing interenterprise cooperation.

Within the republic, the trend is towards greater migration of the population from the rural areas to cities. Although this reduction in the size of the rural population is a natural one, nevertheless it is taking place in too intensive a manner and it is exceeding the optimum rate to a considerable degree. In particular, the departure of youth from the rural areas is quite high. As a result, the average age of a rural inhabitant is approaching 50 years and, as a result, a sharp reduction in the birth rate is being observed in the rural areas. In 1977, when the natural increase in population in the republic's cities was 9.5 individuals per 1,000 inhabitants, in the rural areas -- only 0.4. As a result, some kolkhozes and sovkhozes are already experiencing a shortage of man-power. This process has been expressed very clearly in a number of rayons in the northern and northeastern parts of the republic.

The principal factor with regard to improving the availability of labor resources for agriculture and retaining youth in the rural areas is that of constantly improving the working and living conditions of the population. Experience has shown that no man-power problems are to be found on those farms which develop well organized settlements -- having complexes of domestic, cultural, school, medical and athletic facilities. The youth willingly settle down and remain to work on such farms. The task of attracting labor resources into agriculture can be resolved only by raising the working, domestic and living conditions in the rural areas to the levels which exist in cities.

The republic's farmers are presently concentrating their efforts on successfully completing the Tenth Five-Year Plan and worthily preparing, with new successes, for the 26th Congress of the communist party of the country.

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INTEGRATION OF PRIVATE SUBSIDIARY FARMING, PUBLIC SECTOR ADVOCATED

Moscow EKONOMIKA SEL'SKOGO KHOZYAYSTVA in Russian No 12, Dec 80 pp 75-80

/Article by Ivar Khel'mutovich Rayg, junior scientific worker at the Institute of Economics of the Estonian SSR Academy of Sciences: "Combination of Public Production and Private Subsidiary Farming"[1]/

> /Text/ Speaking at the November (1978) Plenum of the CPSU Central Committee, Comrade L. I. Brezhnev said the following: "The possibilities of the subsidiary farms of plants and factories, as well as of the private farms of the rural population, are still not utilized efficiently. We adopted decrees on these matters, but so far they have been fulfilled slowly. These farms must be helped more in the acquisition of young stock and in fodder supply. It is also necessary to create a certain public climate in which kolkhoz members and sovkhoz workers would feel that, by raising livestock and poultry at home, they are engaged in a useful state cause."
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> Life itself confirms the validity of these words. Some problems connected with the development of subsidiary farms are discussed in the data published below.

For a long time scientific institutions have not paid sufficient attention to private subsidiary farming. To some extent this was due to its underestimate in practice as well. It was considered that private subsidiary farming would wither away in the near future. However, this point of view proved to be unfounded. First, statistical data indicate that the size of gross output of private subsidiary farming throughout the country over a period of several years has changed little. Only its proportion in gross agricultural output in all farm categories has changed significantly. Second, the population's interest in collective orchard and garden growing is increasing. In our country about 43 million families are now engaged in private subsidiary farming. Almost all population categories have private subsidiary farms. These farms produce approximately one-fourth of the country's gross agricultural output. Thus, private subsidiary farming leaves a certain mark on the entire system of production relations and on the rates of development of the entire national economy. Therefore, only an all-around (system) investigation of the problems of private subsidiary farming will make it possible to better solve both the theoretical and practical problems connected with it.

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[1] As a formulation of the problem.

At the end of the 1960's and the beginning of the 1970's the interest of Soviet economic science in problems of private subsidiary farming increased considerably. A number of scientific works (monographs by G. I. Shmelev, V. A. Belyanov, V. Ye. Grigorovskiy and M. A. Alekseyev and others) were published. V. G. Venzher, Ye. A. Vladimirskiy, T. I. Zaslavskaya, T. Ye. Kuznetsova, I. V. Makarova, L. V. Nikiforov, R. V. Ryvnina, I. F. Suslov and others made an important contribution to an investigation of individual theoretical, methodological and practical problems of private subsidiary farming under the conditions of socialism. However, some aspects of private subsidiary farming have not yet been studied sufficiently.

The works by the above-mentioned and other economic scientists mostly examine the economic aspects of private subsidiary farming. However, the social problems of its development have been worked out in an extremely insufficient manner. The private subsidiary farming of the urban population remained almost without any attention in the economic and social literature. However, a certain number of these subsidiary farms (in the form of cooperative orchard growing and the use of plots near individual homes) also produce agricultural products, although in the forms, methods and goals of management they differ greatly from the subsidiary farms of rural dwellers.

Qualitative new changes in the socioeconomic development of the agrarian sector connected with processes of interfarm cooperation and agroindustrial integration, which develop ever more intensively, take place under the conditions of developed socialism. These processes create the prerequisites for the further accelerated transformation of all the aspects, conditions, level and way of life of the rural population. Under the new conditions the solution of practical problems concerning private subsidiary farms requires primarily a theoretical concept giving an idea of these farms as facilities forming part of larger structures and systems of our society, as well as of its role in an increase in the general efficiency of agricultural production. There is a need for reliable knowledge and information on the changes observed in private subsidiary farming and on the processes that affect these changes. There is also a need for a reliable methodological support for the investigation--tools for the collection of information and efficient methods of processing and analyzing it.

This article examines the problems of combination of public production and private subsidiary farming under the conditions of a relatively high level of intensification of public agricultural production as exemplified by the Estonian SSR. At the same time, it utilizes the data of state statistics, of annual reports of kolkhozes and sovkhozes, of two representative sociological and statistical sample surveys of the population and of a poll conducted among the republic's agricultural managers by experts.

The functions of private subsidiary farming in the sphere of social interests. Private, collective and public interests entirely directed toward the fullest satisfaction of the needs of our society's members are reflected in the functioning of modern private subsidiary farming.

Public interests are expressed through the relations between private subsidiary farms and the state. They lie in the fact that part of the national income is produced on these farms and their output is one of the sources of the necessary food products and agricultural raw materials.

Collective interests are expressed through the relations between private subsidiary farms and agricultural and other enterprises and consumer cooperatives, which help in the management of the former. Private subsidiary farms participate in the process of reproduction of the manpower of collectives and by their existence indirectly contribute to the development of public agriculture (Shmelev, G. I., 1975). A sharp reduction in the output of private subsidiary farms can slow down the rates of development of all agriculture. According to our calculations, in the Estonian SSR alone, to replace the livestock products produced on private subsidiary farms, public farms would have to keep approximately 120,000 additional head of large horned cattle, 50,000 hogs, 140,000 sheep and goats and 1 million head of poultry and there would be a need for more than 10,000 additional livestock breeders with a large annual wage fund.

Personal interests are an important moving force in the management of private subsidiary farming. This group of interests includes primarily family interests. Private subsidiary farming gives the rural population a significant part of the food products consumed by it and income for meeting other needs and it satisfies the needs of the urban population for activities in the heart of nature and for active rest. As a rule, its production functions are secondary.

Socialism created a social basis for the combination of different economic interests. In our developed socialist society, where there are no antagonistic economic contradictions, there are all the necessary conditions and possibilities for a successful combination of public, collective and personal interests in the functioning of private subsidiary farming. Public ownership of the basic means of production, primarily of land, is the material basis for the unity of these interests. The unity of these interests lies in the fact that citizens, who in one case appear as individuals and in another, as members of a producers' association on a scale of collectives or the society at large, are their bearers.

Under socialism these interests are combined so that personal and collective interests cannot predominate over public interests. On the other hand, the satisfaction of public interests should contribute to the satisfaction of collective and personal interests. The possibility for a harmonious combination of public, collective and personal interests stems from the very system of socialist production relations. However, this possibility is not always realized. In our opinion, a correct combination of all these three types of interests is to contribute to an increase in the efficiency of both public and private subsidiary farming in the production of food products. Since collective interests play an important role in the process of combination of personal and public interests, this process should be carried out by bringing personal interests closer to collectives interests and, therefore, by bringing collective interests closer to public interests.

The functions of private subsidiary farming are performed simultaneously with regard to all types of interests. Moreover, these functions are interwoven and they interpenetrate and supplement each other. This article examines the functions of private subsidiary farming only with regard to social interests.

At the first stages of development of socialist society private subsidiary farming retained some features of small private farming and, although its relations with public production increasingly developed and strengthened subsequently, the present socioeconomic relations of this farming express its dual nature. On the one hand, it is an integral part of socialist agriculture and, on the other, it is small-scale production managed on the basis of primitive means of labor, which represent primarily the private property of citizens of socialist society. The dual socioeconomic nature of private subsidiary farming makes it possible to divide the functions of this farming with regard to social interests into those promoting and hampering the development of social and territorial subsystems of socialist society. The former include the following basic functions of private subsidiary farming:

production of additional agricultural produce necessary for meeting the needs of society's members for food products: for personal consumption by direct producers and for sales. The statistical data of the USSR Central Statistical Administration show that the role of private subsidiary farming in the production of food products in different regions of our country is by no means the same;

assistance to an increase in the population's (primarily rural) monetary income and standard of living. The data of budgetary surveys of the USSR Central Statistical Administration show that, although the share of income from public production rose considerably in the combined income of families of kolkhoz members and sovkhoz workers, the income from private subsidiary farming still continues to play an important role in the reproduction of manpower in rural areas;

involvement of additional labor resources in the production of material wealth, that is, pensioners, disabled persons, adolescents for purposes of labor education and, partially, citizens who do not yet have their own subsidiary farms. Labor resources whose employment in the public sector is associated with difficulties can be utilized successfully on private subsidiary farms. Through private subsidiary farming pensioners and disabled persons can satisfy their needs for socially useful activity;

assistance to the intensification of land use and cultivation of hitherto undeveloped land. Some plots of land (for example, in mountains, in forests, along lake and sea shores and so forth) are objectively unusuable in modern large-scale production. Therefore, the allocation of such land for use by individual families or associated collectives is not at variance with the interests of public production;

inhibition of the processes of urbanization and migration. The data of various sociological investigations show that the migratory mobility of owners of private subsidiary farms and private homes is comparatively smaller than of those that do not have them;

assistance in occupying the free time of the population (primarily urban) and to satisfying its needs for activities in the heart of nature. The great demand of city dwellers for various forms of management of collective orchard and garden growing points to this important function of private subsidiary farming;

assistance in retaining or raising the population's social status and prestige.

In our society we still observe a number of functions of private subsidiary farming negatively affecting the development of society's social and territorial subsystems in the necessary direction. In our opinion, many negative functions are due not only to the dual nature of private subsidiary farming, but in many respects to the shortcomings in the regulation of the functioning of private subsidiary farming, in particular shortcomings in the combination of public, collective and personal interests. Ultimately, overcoming the dysfunctions of private subsidiary farming will lead to a more harmonious combination of personal and social interests. This does not mean that all personal interests will become social. Specific personal interests will be retained mainly on the basis of social needs.

What functions of private subsidiary farming negatively affect the harmonious socioeconomic development of our society's social and territorial subsystems?

First of all, the existence of private subsidiary farming contributes to the formation of an additional load on the person employed in public production (agriculture) during intense periods of field work and sharply limits the free time of the rural population. According to the data of various investigations, family members employed in public production account for 60 to 90 percent of the labor expenditures in private subsidiary farming. The dual employment of the population is a very acute problem in regions with a large manpower shortage.

In some cases private subsidiary farming is the reason for the violation of the law of distribution according to labor. This dysfunction is connected with the fact that the product of labor of private subsidiary farming can appear in two forms--physical and commodity forms. In the latter case the owners of subsidiary farms--this especially concerns the population categories that do (did) not take part in direct public production--can also indirectly obtain unearned income, because, when they sell produce on the market, the surplus product remains almost entirely (only a minimal tax is deducted) in their personal possession. Such a product of private subsidiary farming does not participate in the formation of the social consumption fund. However, all the members of our society use the resources of this fund.

One of the dysfunctions of private subsidiary farming lies in the fact that the existence of the latter contributes to a differentiation of the population's way of life and standard of living. The data of budgetary investigations point to this. The transformation in some cases of private plots into a source of spread of weeds and plant pests and diseases to public crops and of animal diseases to public livestock also has a negative effect. In most cases this is due to the fact that in private subsidiary farming often the requirements for agricultural techniques of crop cultivation are not observed, crop rotation is not introduced or mastered, an adequate veterinary inspection of livestock is not made and so forth.

The efficiency of private subsidiary farming. Considerable land, material and labor resources are utilized in private subsidiary farming. Therefore, it is also advisable to examine labor productivity and economic efficiency in the indicated production sector. True, this task is very difficult, because by means of the available statistical data it is impossible to determine the efficiency of private subsidiary farming with sufficient accuracy and an acceptable method of determining it has not yet been worked out.

Some authors characterize the efficiency of private subsidiary farming by any one indicator, that is, labor productivity or the magnitude of the net product of this farming (Rukosuyev, P. N., 1978). In the first case efficiency is determined by the correlation of the population's income per unit of labor spent in private subsidiary farming, or by the volume of gross output per worker employed in such farming.

The calculation of these indicators of efficiency is of definite interest, although such determinations are obviously insufficient. First of all, the indicators mentioned do not make it possible to take into account the help given by the public sector to private subsidiary farming. Therefore, these indicators can be used only for a comparative analysis of labor efficiency in public and private production under specific conditions. It is well known that public farms give the population ever greater help in the management of private subsidiary farming. On the population's subsidiary farms soil cultivation, freight transport and so forth are almost fully carried out with equipment not constituting private property.

For example, in the Estonian SSR the population is given help in the management of private subsidiary farming primarily in an official manner for a specific fee.

Our calculations show that in the republic there is a tendency toward an increase in the income from private subsidiary farming per unit of spent labor. In the last few years kolkhoz members have received approximately the same net income per hour of work on a private subsidiary farm as per hour of work on a kolkhoz. The data on the income of kolkhoz members from public production and private subsidiary farming make it possible to conclude that specific conditions for an efficient management of private subsidiary farming for the purpose of meeting direct personal interests have already been created in the Estonian SSR. However, such a situation is fraught with the danger that people who are successful in private subsidiary farming will lose their interest in public production. It is characteristic that in plant growing the efficiency of private subsidiary farming is higher than in animal husbandry. This is quite legitimate, because in plant growing it is possible to more widely use the help of public farms.

Integration of the public sector and private subsidiary farming. The attainment of the necessary proportionality and balance of all the existing production, economic and social resources is now one of the main conditions for an increase in the efficiency of agricultural production. How can private subsidiary farming help to contribute to a more efficient utilization of the productive resources of our society in the agrarian sector?

Industrialization of agricultural production presupposes a more efficient utilization of land. At the same time, production of products on large tracts of land and a more active utilization of biological growth factors are put in the forefront. Therefore, neither will industrial farming involve all agricultural land in the future, in connection with which part of the land will be withdrawn from agricultural turnover. In the Estonian SSR there are relatively many plots of land not suitable for large-scale production, or such on which large-scale production is not very efficient. These plots are located on islands, hills in Estonia's southern part and the seacoast. It is necessary to optimize land use so that it may contribute to a more efficient utilization of all areas. It is advisable to establish orchard growing cooperatives on land heretofore not used in agriculture or withdrawn from the turnover of public farms.

The practical experience of orchard growing cooperatives has already demonstrated their useful role in the intensification of land use. Significant expenditures are not required from society for the management of such orchard growing. In their free time people voluntarily work on a plot of land and increase its fertility. In the Estonian SSR more than 12 percent of all the orchards belong to orchard growing cooperatives. Approximately one-third of not very productive and two-thirds of barren land has been allocated for these cooperatives and it is utilized intensively now.

The division of production and labor between public and private subsidiary farms is now expressed in the fact that items that in the public sector are still produced in insufficient quantities, with big labor expenditures and at a high cost make up the highest proportion on private subsidiary farms. Under Estonia's conditions they include vegetables, fruits and berries. The republic's public farms are interested in the production of such products on the population's private subsidiary farms. For this purpose it is necessary, through the development of an interaction between private subsidiary and public farms, to also raise the level of labor mechanization in private subsidiary farming. Furthermore, such relations can increase the degree of utilization of agricultural capacities.

In our opinion, it is advisable to integrate in a certain selection the resources of public and private farms for the attainment of the best results in agriculture as a whole. The use of some machinery and equipment of public farms in private subsidiary farming needs relatively negligible capital investments. The fund for depreciation and expansion of production at the expense of accumulations is not established. There are no expenses on production management and different other unproductive expenditures. In private subsidiary farming it is possible to use implements obsolete for large-scale production and young stock, buildings and equipment discarded by large-scale production. Household waste is fully utilized there (it is used as fertilizer or for livestock feed, without polluting the environment). Furthermore, the production cycle in private subsidiary farming improves under the effect of mechanization and big technical and biological transformations occurring as a result of the industrialization of public agriculture.

A tendency toward the integration of private subsidiary and public farms is already observed in some sectors (for example, in beef cattle husbandry). Public farms help the population to prepare feed and to sell and process the livestock products of private subsidiary farms.

This type of integration is also carried out in poultry breeding and in potato, vegetable and even orchard growing. Of course, it is more refined in poultry breeding. Large farms breed chicks in artificial incubators and organize feed production for them, while private subsidiary farms partly raise them. Such a distribution of individual phases of the technological process between large public and small private subsidiary farms is economically advantageous for both and fully meets the basic interests of our national economy.

In many plant growing branches the integration of public production and private subsidiary farming is not only possible, but also necessary owing to their technological characteristics. For example, lucerne, clover and some other crops are pollinated mainly by bees. Therefore, the use of these insects for the pollination of such crops, as well as orchards, is one of the mandatory methods of increasing the yield on public farms. In the republic mainly private subsidiary farms are now engaged in bee keeping. In such a case the transportation of beehives to orchards and areas with crops requiring pollination is of mutual interest both for public production and for private subsidiary farming.

Of course, economic relations between public and private subsidiary farms can be established, in addition to the sphere of production, in the spheres of the sale and processing of output.

A fuller involvement of labor resources in socially useful activity and their efficient utilization is one of the basic factors in the economic development of the Baltic union republics. In our opinion, labor mechanization in private subsidiary farming will make it possible to reduce time expenditures on its management and will disengage a certain part of the labor resources for their more efficient utilization in the public sector.

Investigations by Siberian scientists also show that in our country at present private subsidiary farming not so much diverts labor resources from public farms as it attracts labor resources in the sphere of material production not available to them (Antonov, T. P., 1977).

Thus, an optimum combination of public production and private subsidiary farming and their all-around cooperation make it possible to successfully use land and production-technological and labor resources of agriculture and thereby to increase its efficiency.

The overwhelming majority of our scientists now believe that at a certain stage in the development of agriculture society's needs for food products will be met fully through public production and, thereby, conditions will be created for the withering away of private subsidiary farming.

However, the development of our country's agrarian sector is characterized by a complication of its socioeconomic functions in society. Along with traditional tasks in the production of the necessary food products and raw materials for industry the role of the agrarian sector in the protection and reproduction of natural resources increases considerably. Its recreational, spatial, demographic and social functions are important (Zaslavskaya, T. I., 1978).

As large-scale public production and small-scale private subsidiary farming specialize in the performance of the mentioned functions, the smoothing out of contradictions between public and private subsidiary farms is observed in our society. Large public farms perform the functions of production of the predominant part of agricultural produce. Private subsidiary farms will perform recreational and other social functions to an ever greater extent. It is remarkable that in the process of development of agriculture the differentiation of its elements in the performance of various social functions contributes to some extent to an intensification of the mutual dependence of public and private subsidiary farms. Under present conditions collectivized large-scale production indirectly needs the existence of private subsidiary farming. However, private subsidiary farming can hardly exist without the public production sector, because all the basic means of production are publicly owned and the functions performed by private subsidiary farming are determined depending on how public production fulfills the tasks set by society for the country's entire agrarian sector.

The general tendency toward the development of private subsidiary farming under the conditions of developed socialism is characterized by the fact that in the process of objective development of productive forces in agriculture it gradually is deprived of its economic functions. At the same time, in accordance with the general tendency toward development an intensification of its social functions is observed. Ultimately, private subsidiary farming from a form of production organization will be transformed into a variety of housekeeping and a form of satisfaction of workers' social needs and rest.

In the last few years the republic's rural population has begun to search for new ways of increasing the efficiency of private subsidiary farming and reducing labor expenditures in it. In addition to the expansion of integral relations between large-scale public and small-scale subsidiary production, relations among the owners of private subsidiary farms continue to develop, leading to the formation of collective subsidiary farming. The latter already appears as one of the forms of production collectivization. Such relations have been established among groups of families or even among the families of a whole village.

Since at present there are no practical possibilities for a mechanized cultivation of private plots (there are very few orchard tractors), the owners of plots of land find a way out in the unification of their land. Together it is possible to better cultivate land (in such a case a plot of land can be even far away from the place of residence) and to sell or process output. On the basis of the data of a poll conducted among agricultural managers in the Estonian SSR by experts, collective subsidiary farming is more widespread in the cultivation of potatoes (on the territory of 31 percent of the republic's kolkhozes and sovkhozes) and grain (23 percent). This form is less popular in the cultivation of fodder crops (on 6 percent of the farms) and vegetables (5 percent) and in the keeping of private livestock (5 percent). The forms of collective subsidiary farming are widespread primarily on the territory of economically strong kolkhozes and sovkhozes, whereas, in our opinion, the organization of collective forms of management and an increase in the efficiency of private subsidiary farming would be necessary, first of all, on economically weak kolkhozes and sovkhozes. In practice, however, work in this direction is not yet done.

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AGRO-ECONOMICS AND ORGANIZATION

ADVANTAGES, BENEFITS OF PRIVATE PLOTS EXPLAINED

Kiev PRAVDA UKRAINY in Russian 3 Jan 81 p 2

[Article by I. Kolesnik, chairman of the executive committee of the Kazatinskiy Rayon soviet of people's deputies, Vinnitskaya Oblast: "The Advantages of Private Plots"]

[Text] The village resident is assiduous. He will measure something 10 times before cutting and he will not raise anything in his private plot that is not useful. As an example of this type of economic management we can point to the household of the Tsimborovich family in the village of Ovsyanka. Mr. Tsimborovich, Petr, is a tractor operator, and his wife Ludmila is a calfwoman. Together they raise chickens, geese, piglets and a cow.

There is a mixed attitude toward owning one's own cow--no matter what the yield, it is said, the main accounts are made in the mechanized farm, but still it is impossible to disregard one's own cow yet. Today the rayon's residents own 12,400 head of large-horned cattle (including 7,673 cows) and 12,800 hogs. The help in securing foodstuffs is quite evident.

The executive committees of rayon and village soviets of workers' deputies have strengthened controls over the use of private plots by kolkhoz farmers, workers and employees. We simply have no right to allocate our lands, the main source of our well-being, poorly. The deputies of local soviets have determined measures that are directed at increasing agricultural production output in private plots and the procurement of surpluses from the population. They gave special attention to the development of initiative in this important matter. The volume of product sales has been established for each household and the necessary help is given to achieve this goal.

We feel that the proposals of the draft of the Basic Directions are very timely and necessary. They discuss the necessity of increasing the production of meat, milk, potatoes, vegetables and fruit in the private plots of the population as well as in orchard and garden partnerships of workers and employees, rendering aid in the acquisition of young animals, feed, seed and fertilizer.

Recently the administrations of kolkhozes and sovkhozes have begun to sell more piglets, young birds, and pedigree rabbits, to allocate more feed, seedlings, saplings, seed and to send equipment to cultivate private plots to the residents.

The question of feed is not a simple one. Kolkhozes and sovkhozes sell the population coarse and concentrated feeds, husks and haulm of sugar beets. All of this has meant that in turn the population has been selling more meat, eggs, milk and fruit. Good work was performed by the Ovsyanetskiy, Belopol'skiy, Vernigorodskiy and other village soviets, which significantly surpassed their goals.

However, the greatest responsibility for organizing the procurement of surplus agricultural products from the population is ours. Our rayon and the deputies of local soviets have come forth with the initiative to increase the output of agricultural products in the private plots of citizens and their sale to the state. The initiative was approved by the oblast executive committee.

In 1980 rayon workers sold the state 300 kilograms of milk per cow (a total of 2,400 tons), 860 tons of meat, 4.4 million eggs and 800 tons of potatoes. By means of a decision of the rayon executive committee, private plots have been allocated 2,400 tons of coarse fodder, 3,000 tons of husks and 905 tons of concentrated feed. Available for use are about 723 hectares of the farm lands that are not in use and 1,400 hectares of agriculturally-useless lands that can be used for pastures. Many piglets have been sold to the population. In each village there have been meetings of citizens and contracts have been concluded arranging for the mutual responsibilities of the population and the kolkhoz or sovkhoz. In each executive committee an accounting of private livestock has been organized and transportation vehicles have been assigned to procurement organs. Surplus agricultural products are received from the population in the rayon in 106 reception-procurement points, of which 38 are permanent and 68 are seasonal.

Rabbit farming is also increasing our meat resources. Each settlement has created public councils of rabbit farmers. They are rendered methodological aid and a network of reception points has been organized.

In this area the work of deputies and executive committees of village soviets has become more active. We would like to recognize the chairmen of executive committees--Comrade Rudenko of the Belopol'skiy Rural Soviet, Comrade Petrenko of the Ovsyanitskiy, Comrade Vergelyuka of the Peremozhnyanskiy, and Comrade Menchinskiy of the Zhezhelevskiy. However, we should not be complacent--not everything possible has yet been done and more can be achieved.

Today we are setting the following goal for all who have private plots--to effectively utilize each plot of land, to maintain as much poultry and as many other animals as possible and to give unfailing attention to apiaries and fruit orchards.

We should not forget resources for increasing meat reserves such as subsidiary farms at industrial and commercial enterprises, hospitals, and schools and such methods as the fattening of hogs using food wastes.

With regard to this I would like to especially emphasize the role of cooperators, which should also be mentioned in the draft of the CPSU Central Committee. They must strengthen their ties with kolkhozes, sovkhozes and private households of citizens, actively search for new organizational forms and expand the network of universal complex procurement points. In cities and workers' settlements there should be an expansion of the retail network for the sale of agricultural products. Stores should be supplied with modern commercial equipment.

There are still unsolved problems regarding private plots. For example, our store, Sortsemovoshch [Quality vegetable seed store], supplies the population well with seed of vegetable crops, but practically no onion sets are sold. There is a shortage of chlorophos to combat the Colorado beetle. Attention should be given to this. An addition should be made to the fifth article of the draft of the CPSU Central Committee, saying that help to the private household should include: "means to protect plants from agricultural pests and diseases."

Our agricultural production stands on a stable industrial foundation. The private plot also brings many benefits with it, but only in those places where it is given some attention.

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TACK, GEAR FOR HORSES IN SHORT SUPPLY IN KAZAKHSTAN

Alma-Ata SEL'SKOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 5, May 80 pp 38-39

[Article by Gryaznov: "Where Can They Find a Yoke?" For related materials please see JPRS 75816, 3 June 1980, No 1236 of this series p 90, and JPRS 76234, 14 August 1980, No 1248 of this series, p 46.]

[Text] In our days of scientific-technical revolution it would seem out of place to talk about a harness yoke. This is especially true when the horse for which it is needed is used less and less for economic purposes. Nonetheless, we must talk about it because horses still do a great deal of work at farms in our republic and yokes are needed for them. To be more precise, it is not just yokes that are needed, but the full assortment of gear. This subject comes up at almost every sovkhoz and kolkhoz. Workers at the Verkhne-Katunskiy Maral [Siberian deer] Sovkhoz, for example, in their desperation to buy them called on the editors of our journal for help.

"Our sovkhoz is located high in the mountains," they write. "For this reason, and also because of deep snow the farm sometimes cannot haul feed to the maral with caterpillar tractors. Every year the horses come to our rescue in these cases. But this year they could not because we did not have enough gear: yokes, tugs, pads, reins, and felting. There are not even riding saddles. It has become very difficult to buy all these things. We have appealed to the managers of the rayon Kazgoskomsel'khoztekhnika Association several times. Their answer is that they do not get these items. We have not had any new gear for 10 years. We repair our old gear, but that does not make much sense because it breaks and tears frequently. But the maral must be cared for. They produce valuable raw material from which medicine is made, in particular pantokrin. The livestock are not receiving essential feed regularly. Please help us buy the gear. Tell us why we are not getting it. Other rayons and oblasts may have plenty of harnessing gear, but we do not."

As we see, yokes have become a pressing problem for the maral raisers of East Kazakhstan. Are they the only ones?

"No, they are not," said Zinaida Nikitichna Chuchman, deputy director of the administration of trade in economic goods of the Kazakh SSR Union of Consumer Societies when we asked her to tell us about the development of trade in tack and gear for horses in the republic. In our attempt to help the maral raisers we visited various organizations and filled many pages in our notebooks with the most diverse information.

"The demand for tack and harness gear this year," Zinaida Nikitichna continued, "is set at 5,756,000 rubles. This is the amount of the requests received from oblast consumer societies. They have been coordinated with the oblast administrations of agriculture. However, only 68 percent of our order was filled."

We should observe that the Kazakh Union of Consumer Societies is a trade organization. Some documents call it a market organization. It delivers goods to the population and to enterprises of the Kazakh SSR Ministry of Agriculture. These customers are distinguished by the fact that the population pays cash, while the enterprises do not, which is a problem for the trade organizations because these receipts are not included in trade turnover. It is a significant point.

But that is not even half of the problem. If only there were something to sell! But there are simply no goods. Here are some examples. The Kazakh Union of Consumer Societies needs 40,000 riding saddles. This year 24,815 will be delivered. They need 4,000 Cossack saddles, and will receive 2,986. They need 15,000 one-horse yokes, but will only be able to sell 7,439. They will receive barely half of the two-horse yokes, rawhide bridles without reins, halters with reins, and many other items that they have requested.

The Kazakh Union of Consumer Societies is not the only organization ordering tack and harness gear. Enterprises of the ministries of fishing, timber and wood processing, and others also need these items. These customers are called non-market customers.

"We used to satisfy all their requests," said senior commodities expert Tat'yana Pavlona Domanova of Kazobuv'torg[Kazakh Footwear Trade Enterprise], "But now we satisfy requests according to their proportion of the total volume of orders. The situation with harness gear is bad in general. Practically no orders are being fully met."

This is obvious from the figures of the republic Ministry of Agriculture. In 1978 the needs of its enterprises for particular items were met as follows: 27.8 percent for one-horse yokes, 47.2 percent for two-horse yokes; 44.7 percent for rawhide bridles with reins. The figures were no better in 1979.

Why did this happen? Why has the horse been improperly excluded from production?

There is just one enterprise in the republic that makes tack and gear. This is the Georgiyevskiy Leather Combine of the Kazakh SSR Ministry of Light Industry. It is located in Dzhambulskaya Oblast and was set up in the early 1960's. A long time has passed since then.

"The combine is now operating on a stable basis," said L. A. Gershenzon, chief engineer of Kazkozhobuv'prom [possibly Kazakh Leather Footwear Industry Association].

This may be true, because the combine produces many other things in addition to gear for horses. But the situation with tack and gear is far from rosy.

The primary customer , the Kazakh Union of Consumer Societies, received far less than it ordered. The shortfall included 100 one-horse yokes, 200 two-horse yokes, 3,000 rawhide bridles, more than 9,000 rawhide harnesses with reins, and many other items. In the first two months of this year the combine fell 96,000 rubles behind in its production program for these items.

The situation with the production of tack and harness gear is a matter of constant concern in the division of light industry at the republic Gosplan. Subdivision chief S. K. Aytekov went to the combine to find out what was happening. He learned that, to put it mildly, there have been very few changes there in recent years. The production area of the shop is just 1,620 square meters. The raw material is also stored in this space. Only 98 percent of their production capacities have been incorporated. They have 55 units of equipment, and 26 of them are 1955 models that long ago became worn-out and obsolete. The level of manual labor is high. Therefore, the shop failed to fulfill its state plan for 1979 in 16 of its 30 types of output. Furthermore, the quality of many of their products cannot withstand criticism.

Suppliers make shop work very irregular. The Arzamas Felt Factory systematically violates its contract obligations. Last year, for example, it fell 59 tons short of its obligations to deliver 130 tons of saddle felt to the combine. Instead it delivered 34 tons of yurt [nomadic tent] felt, which is twice as expensive. This was how it "evened out the balance."

The enterprises of our republic are not particularly punctual in performing their contract obligations either. The Kokchetav Felt Factory delivered 27 tons of yurt felt instead of 25 tons of saddle felt. The Semipalatinsk Leather and Fur Association failed to deliver the planned raw leather last year, while the Semipalatinsk Metal Items and Accessories Plant failed to deliver 1,700 pairs of stirrups for Zhel'derme saddles, and the Dzhambul Leather Footwear Association did not deliver 11 tons of rawhide.

Synthetic materials are finding increasing use in the production of consumer goods. Substitutes must be sought for the raw materials of harness gear also. No such search is underway in the republic today, although there are two institutes, the Kazakh state planning and technological institutes of Light Industry and Domestic Industry, which could do it.

There is one more problem that must be solved.

It was noted above that enterprises of the Ministry of Agriculture receive harness gear through the Kazakh Union of Consumer Societies and are considered market customers. The fact that the sale of harness gear on a non-cash basis is not included in the trade turnover plan has a definite impact on the activities of trade organizations. The time has come to put this business under the management of Kazgoskomsel'khoztekhnika. Incidentally, this has already been done in the Baltic republics and Belorussia. Their experience indicates that such a transfer improves the supply of harness gear to kolkhozes and sovkhozes.

The horse today is not used for sport alone. The geologist and forester cannot get along without horses. The herdsmen in winter camp and high summer pastures needs horses, as do the livestock worker at the farm, the shepherd in the field, the fisherman, and the border guards. But the horse must be "equipped," with well-made, convenient, and up-to-date gear.

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AGRICULTURAL MACHINERY AND EQUIPMENT

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PROSPECTS FOR DEVELOPMENT OF AGRICULTURAL EQUIPMENT REVIEWED

Moscow TEKHNIKA V SEL'SKOM KHOZYAYSTVE in Russian No 12, Dec 80 pp 12-13

[Article by A.I. Timofeyev, doctor of technical sciences and Z.V. Lovkis, candidate of technical sciences at the Moscow Institute of Agricultural Production Engineers imeni V.P. Goryachkin: "Prospects for Development of Farming Assemblies"]

[Text] The modern trend in the development of power engineering for farming is characterized by constant increases in the horsepower and weight of the tractors.

Powerful and heavy equipment promotes a breaking up of the soil structure and packing of the soil, even in the lower layers, to a depth of from 2.0 to 2.5 meters and this brings about soil salinization and water-logging. Studies have established the fact that one pass by a heavy tractor packs the soil by 19-20 percent and two passes -- up to 40 percent. As a result of such packing and the breaking up of the soil structure in the lower layers, soil degradation caused by water erosion is noted taking place in all areas. The principal cause -- incorrect utilization of technical equipment and the mechanical methods for tilling the soil.

It has been established that 300 years are required for the formation of a 25 mm thickness of soil. This period can be reduced to 30 years if a correct cultivation method is employed. In the case of intensive farming, the retention and development of natural soil fertility are impossible in the absence of artificial measures -- chemical fertilizers, stimulating the development of a biosphere in the soil, use of the correct methods and technical equipment for tilling the soil in conformity with the specific conditions.

In the interest of making complete use of a tractor's power during field operations, the power should properly be distributed along two channels -- through the hook and the VOM [power-takeoff shaft. In recent years, this has been accomplished by means of ganging with agricultural machines having active working organs. But only a few such machines are as yet available.

The task of radically raising the technical level of agricultural machines requires the creation of new models based upon the positive results obtained from exploratory and scientific-research work. Compared to machines presently in production, future machines must serve to raise productivity by a factor of 2-3. This can be achieved through the use of new technical solutions and technological processes.

Are reserves available for solving the tasks associated with the technical revolution in farming? Today this question brings forth a very positive response, especially with regard to the mechanical tilling of soil. This reserve includes the possibility of utilizing the mechanical properties of the soil for the carrying out of useful work: movement of machines and the execution of a technological process. The function of the driving mechanism in such a machine is combined with the working organ. Its movement is carried out as a result of the soil's reaction, which affects the working organs during the work process.

The utilization of the reaction forces of various mediums for the carrying out of useful work is employed extensively in turbines, aircraft, aboard ships, in hydro-mechanical systems and so forth. The movement of all types of ground transport mobile equipment and tractors is also based upon the use of the reaction forces of supporting surfaces (soil, asphalt roads and so forth).

Today the possibility of utilizing the forces of reaction of soil in soil cultivation machines has become a reality. Experimental-theoretical work on the creation of such machines is being carried out by the Department of Soil Cultivation Machines of MIISP [Moscow Institute of Agricultural Production Engineers imeni V.P. Goryachkin].

The first individuals to propose a "reactive plow" were D.I. Zverko and V.M. Kolomnets. Their design consisted of two caterpillar track sections (similar to tractor caterpillar tracks), installed at an angle of 35-40° to the direction of movement. Sixteen plowshare-mouldboard plow frames were installed on each of these sections -- on a scale of 1:4 for plowing to a depth of up to 15 centimeters. Eight frames were included in the operation in each section. The forced movement of the caterpillar tracks was accomplished by means of four electric built-in motors -- two to each section. The overall capability of the motors -- 16-18 kilowatts. The operating width of the plow -- 4.5 meters. The plow was produced over a year's time and underwent testing out on the fields of the Borets Sovkhoz in Moscow Oblast. The test results were splendid.

Theoretical and experimental studies were carried out on a soil cultivation self-propelled machine of the rotary type having screw conveyer and blade working organs. Its operating width -- 1.5 meters and depth of loosening -- 15 centimeters. Its estimated speed of movement -- up to 20 kilometers per hour. This machine achieved complete loosening of the soil (harrowing excluded). It does not require surplus weight, since in the absence of supporting rollers it is capable of digging into the soil independently.

Both of the proposed machines are capable of developing surplus traction, which can be employed for combining operations (fertilizer applications, sowing operations and so forth).

Compared to a conventional plow and cutter, the productivity of the plowshare-mouldboard self-propelled plow and the rotary soil ripper is higher by a factor of 3-4, metal consumption is 50 percent lower and labor and power expenditures are reduced by 50-70 percent.

Machines having active working organs can not only be self-propelled but they can also be ganged with conventional tractors, thus promoting movement of an assembly based upon the development of a propelling force.

The use of self-propelled soil cultivation machines opens up broad opportunities for combining different operations, while realizing savings in the use of metal, power and labor and raising the productivity of the assemblies.

Self propulsion for farming machines can be carried out by means of a hydraulic motor drive for their driving mechanisms. Here the role of the tractor reduces to that of controlling the movement of the assembly and supplying liquid to the motors; this lowers substantially the metal consumption and power rating of the tractor itself.

At the present time, in connection with the changes that have taken place in the system of machines and also the appearance of self-propelled harvesting machines and implements having active working organs, the attention of workers in the Department of Soil Cultivation Machines is concentrated on raising the technical level and automation of these machines and also on improving the working conditions of the machine operators.

The use of hydraulic drives on soil cultivation and other machines made it possible to solve the following tasks: reduce the number of mechanical components and transmission elements, including reduction gears, universal joints and circuits; control individually the speed of the various working organs (conveyers, elevators, drums, cutting and milling units and so forth), depending upon the physical-mechanical properties of the material being processed, biological composition, cropping power, weather conditions, mechanical structure of the soil and micro and macro-relief; ensure reliable protection of the working organs against overloads by limiting maximum movement within a system (a hydraulic cut-out operates 2-3 times faster than a mechanical one; reverse the movement of the working organs of agricultural machines -- required for cleaning the units and mechanisms and also for the carrying out of technological processes. The hydraulic drives have also made it possible to lower expenditures of working time for adjustment purposes and also to reduce operating expenses for the machines owing to a reduction in transmission mechanism breakdowns; remote control over the working organ regimes and to automate the control and adjustment process; to ensure the installation of the active working organs in areas considered to be the most suitable for the lay-out of the machines; to improve the sanitary-hygienic operating conditions for the machine operators and the aesthetic design of the machines.

Four groups of machines and the principal trends with regard to their hydraulic principles can be singled out.

The first group -- self-propelled grain harvesting, corn harvesting, potato harvesting, cotton harvesting, grass harvesting, tomato harvesting and other combines and machines, all of which require a hydraulic drive transmission, working organs, a system for raising and lowering them, a steering system and systems for automatic control and for adjusting the workloads.

The second group -- this includes machines having an active drive: multiple-unit assemblies, rotary plows, cutter-cultivators, mowers, potato diggers, onion harvesting, cabbage harvesting, land reclamation and other machines having hydraulic drive transmissions, working organs and automatic control systems.

The third group -- reactive plows, cutters, rollers, cultivators, rotating harrows, shallow plows, all of which require a hydraulic drive for the working organs and the automatic control systems.

The fourth group includes towed sowing and planting machines -- machines for applying fertilizers, protecting plants and others, all of which require a hydraulic drive for the transmission, for raising and lowering the working organs and for the automatic control systems.

The proposed break-down of agricultural machines into groups, depending upon their design characteristics, complexities and the technological operations to be performed by them, is making it possible to draw a conclusion concerning the importance of the hydraulic principles involved. For example, machines in the first group may provide positive displacement controlled hydraulic drives in the near future, using series hydraulic units for this purpose. It will be necessary only to master the production of low and medium revolution hydraulic motors and also such regulating devices as current throttle-dividers.

Sowing and planting machines, cultivators, towed spreaders and so forth can be improved through the installation of quick-detachable wheels having built-in hydraulic motors and step-down reduction gears, which provide self-propulsion for the machines and a drive for their working organs. Following the completion of a definite type of operation, such wheels could be rapidly transferred to another group of machines.

According to estimates by VISKhOM [All-Union Scientific Research Institute of Agricultural Machinery], the use of hydraulic drives will make it possible to realize an economy of 100 tons or more of metal for every 1,000 agricultural machines, raise their productivity by 8-20 percent and for some -- for example, reactive soil cultivating machines -- by a factor of 2-4.

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AGRICULTURAL MACHINERY AND EQUIPMENT

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MEASURES FOR COMBATING MULTI-MODEL NATURE OF TRACTOR FLEET

Moscow TRAKTORY I SEL'KHOZMASHINY in Russian No 12, Dec 80 pp 2-4

[Article by I.I. Trepenenkov, doctor of technical sciences at State All-Union Scientific Research Institute of Tractors: "Multi-Model Nature of Tractor Fleet and Measures For Combating It"]

[Text] Recently, in a number of publications and letters received from machine operators, just comments have appeared concerning the excessive multi-model nature of the tractor fleet of farms. This has brought about an increase in the requirements for agricultural machines and in the nomenclature for spare parts and it is complicating the work of the machine operators. A need has arisen for examining this phenomenon in detail and outlining measures for combating it. Here, although we are limited to analyzing the status of the tractor fleet, nevertheless our conclusions can be extended to include the machine-tractor fleet on the whole.

First permit me to define some principal terms.

Two different designs for the same generation of equipment, having the same type and size and being produced simultaneously will be referred to as duplicated models, for example the DT-75 and T-74 machines.

During the course of technical progress, a rational changing of models and of equipment generations takes place. For example, the earlier produced T-100M tractor has now been replaced by the more improved T-130 of the same type and size. For a number of reasons, the T-100M tractor has been produced simultaneously with the new T-130 machine over a period of several years. These models cannot be viewed as duplicate-models. The T-100M is the predecessor model.

The conversion over from the production of an old model to producing a new one of the same type and size is at times carried out according to the "unit by unit" principle (conversion by stages). The transitional models are produced over a certain period of time. For example, several transitional models were produced during the course of converting over from the production of the MTZ-5 tractor to the MTZ-50 tractor.

The production by industry of duplicate models, transitional models and also the extended production of predecessor models, simultaneously with the production of new tractors which replace the latter, increases the multi-model nature of the fleet and thus is permissible only under economically justifiable conditions.

At the dawn of Soviet tractor construction, only one model of tractors was being produced: in 1924 the Fordzon-Putilovets and in 1930 the CKhTZ. At the end of the Great Patriotic War -- two tractor models: Universal-2 and ASKhTZ NATI. Such a poor nomenclature constituted a great shortcoming. At the present time, it has increased considerably -- an achievement of the tractor builders.

Tractors are employed extensively in agriculture, in 20 natural-climatic zones, in the cultivation of more than 200 different crops. Special models are required for cotton growing, viticulture, beet production, tea production, greenhouse operations and for other agricultural requirements. Tractors are also used for earth-moving and levelling work, for the construction of buildings, installations, canals, dams, gas and oil pipelines and all types of roads and in the timber industry, forestry and in many other branches.

If the national economy is not supplied with tractors of the required types and sizes, then it becomes necessary to carry out a number of operations either manually or by using tractors of other types and sizes which are less efficient in carrying out such work.

The scientists and specialists of agriculture and industry are developing a system of machines for the complex mechanization of agricultural production for each five-year plan (and commencing in 1981 -- for 10 years). The Energetika section of this system, for the 1976-1980 period, contains 54 types and sizes of tractors required for agriculture. Twelve additional types and sizes are required for other branch-consumers. These include powerful pipe-laying tractors, industrial modifications of basic agricultural models and some others.

Thus the officially approved list of tractors includes 66 types and sizes. This nomenclature must be viewed as the minimum number required, since a number of branch-consumers submitted orders for a larger number of tractor types and sizes and it was only on the basis of technical-economic studies that the adequacy of the above-mentioned nomenclature was proven.

The number of tractor types and sizes being produced in the USSR is considerably less than the required number. In 1978, for example, only 30 tractor types and sizes were produced, that is, the existing nomenclature was less by a factor of two than the figure considered to be scientifically justified.

We are still not producing certain tractors required for the national economy:

...the Class 6 kH high clearance, forestry machine with its improved cross country ability;

...the Class 8 kH for greenhouse operations;

...the Class 14 kH wheeled machine for mountainous operations and for rice growing;

...the Class 20 kH wheeled multi-purpose row crop machine;

...gantry vineyard machine;

...windrow-skidding machine mounted on a TT-4 tractor;

...pipe-laying tractors for the construction of gas and oil pipelines, a number of types and sizes of heavy industrial tractors and so forth.

It is clear from the above that it would be wrong to reduce the number of tractor models under production by limiting the number of tractor types and sizes. On the contrary, it should be increased considerably. At the same time and despite the still insufficient number of tractor types and sizes being produced in the Soviet Union, the production of excessive machine models is being observed and this is taking place for two reasons. First of all, duplicate models are being produced: in 1979, for example, there were two such models. Secondly, obsolete predecessor models have been retained in production for several years, despite the fact that they should have been removed from production in view of the fact that their replacement models had already been created and were being mastered in production operations. Ten such models were produced in 1978. No transitional models were produced in 1978.

In all, 42 tractor models were produced representing 30 types and sizes, of which number 26 types and sizes are being employed in agriculture.

In order to alleviate the multi-model problem, it is deemed advisable to ensure that the number of models being produced does not exceed the number of types and sizes. If success is achieved in this regard, then the number of models in production could quite properly be reduced by 30 percent and this would accordingly alleviate the multi-model problem on the farms by the expiration of the amortization period (8 years). It is obvious from the above that this method alone will not make it possible to alleviate radically the multi-model problem in the fleet.

When converting industry over from the production of old predecessor tractor models to the production of next generation models (even if this replacement is carried out on a one-time basis and the old model is removed from production immediately) in agriculture, both models (the old and the new) are used simultaneously throughout the amortization period, that is, for approximately 8 more years. Hence it follows that the number of tractor models in the fleet is always roughly greater by a factor of two than the number in production.

Since industry produced 42 tractor models in 1978, including 38 for agriculture, the number of tractor models in the agricultural fleet can be estimated as being 76.

However, the overall number of kolkhozes and sovkhozes amounts to 48,000 and it is not mandatory for different types of tractor models to be operated at each of these farms. Scientifically sound methods have been developed for staffing the tractor fleet. Here we are limited to just basic considerations.

The optimum structure for a farm's tractor fleet (department) is dependent upon the type of farm. For example, the grain economy can manage with just two models of plowing tractors: wheeled and caterpillar; the optimum traction class is dependent upon the dimensions of the field tracts of land. If a farm has row crops, a need will arise for multi-purpose row crop tractors. If a farm is carrying out irrigation work, land reclamation (swamp) tractors will be required. For kolkhozes and sovkhozes located in forest and forest-steppe zones, skidding tractors ideally should be available. In addition, livestock husbandry farms will require low-power multi-purpose tractors for carrying out transport and auxiliary operations. Thus the majority of the farms can manage with from three to seven models of tractors. For subsequent considerations, we will use an average figure of five.

A study conducted in 1979 of the fleet for nine kolkhozes in Krasnodarskiy Kray revealed that, on the average, each farm has 105 tractors representing 18 different models, that is, the number of models on each farm exceeds the number required by an average factor of 3.5-4. Similar situations prevail in other zones.

Earlier, when very few tractor models were being produced in the country, it was natural for each tractor acquired by a kolkhoz or sovkhoz to be retained and operated on that farm until it was no longer suitable for use. At the present time, with a considerable expansion taking place in the nomenclature of goods being produced, the preservation of this obsolete procedure has become the principal cause of the multi-model problem in the tractor fleet of the farms.

When a new tractor model appears in production, its use should initially be planned for a small number of oblasts (krays), rayons and farms, such that tractors of the new model are assigned to each farm immediately and in quantities to satisfy the complete requirements for machines of this model. The surpluses that arise in the old model tractors must be sold to the repair plants. The latter, after completing their capital repair work, can sell the repaired tractors, with appropriate guarantees, to "second parties," that is, to those farms which must still wait several years before receiving the new model.

This proposal is not as radical as it might seem at first glance. The majority of the plants carry out the tractor repair work in an impersonal manner and the tractor in essence is not returned to the farm. The kolkhoz usually is given another machine of the same model and roughly in the same state of wear and tear. A second step still has to be taken: following the capital repair work, the different models of tractors should be redistributed in a manner such that each farm receives a minimum number of models, but ample quantities of each one of them.

Studies carried out at VIM [All-Union Scientific Research Institute of Agricultural Mechanization] established a great difference in the efficiency of the new equipment, depending upon whether or not it was concentrated at a small number of farms or dispersed at the rate of 1-2 tractors per farm. It was determined that the acquisition by a farm of one specimen of a new T-150K type tractor, as a replacement for a discarded T-74, produces a loss of 500 rubles annually. At the same time, the simultaneous replacement at the same farm of all T-74 tractors by the required number of T-150K tractors produces a savings of 1200-1500 rubles annually for each new machine. The dispersion of new tractors among a large number of farms is not only unprofitable for the latter, but in addition it aggravates the shortage of machines usually used along with these tractors.

Using Krasnodarskiy Kray as a true example, we will show how the new T-150K tractor should have been introduced and how it was actually introduced into operations.

Based upon scientifically sound plans, the introduction of the new T-150K tractors was planned to take place at 24 farms in eight rayons throughout the kray.

Actually, the first 380 T-150K tractors were distributed among 164 farms in 34 rayons. Such faulty practice with regard to the immediate assignment of new model tractors among many farms is also typical of other zones.

For example, 90 percent of the kolkhozes and sovkhozes in the Central Nonchernozem Zone have both DT-75 and T-74 tractors, the result of incorrect staffing of the fleet.

Two methods are available for correcting the mentioned shortcoming. The first method -- eliminate excess models from production operations. An attempt should be made to do this, even though it will serve to reduce the number of models by only 30 percent and at the same time require excessive national economic expenditures. If such a measure is implemented, regulation of the fleet will be achieved in 8 years. The second method -- immediate and proper redistribution of the fleet -- the cost will be less and it can be carried out more efficiently.

If we accept a rounded off figure of 48,000 for the number of kolkhozes and sovkhozes and if the average service life for a tractor is 8 years, then it would be more advisable to completely equip 6,000 farms (one eighth of the overall number) with new tractors annually and to resell to second parties the excess machines which were formerly used. During the second year, 6,000 more farms will be completely re-equipped, with this procedure being continued through the eighth year, at which time the cycle will have been completed.

The system for the rational staffing of a fleet and its systematic redistribution among farms is not a new "invention." This system corresponds to a system employed extensively throughout the world, that of redistributing secondhand tractors to second and third parties. It is known that in the U.S.A., England and other countries, the new tractors are acquired by the large and economically strong farms. The small and weak farms are provided with secondhand repaired machines. The prices for secondhand tractors are published on a regular basis in the American and English technical journals. Moreover, the quality of the repair work is so high that the repaired tractors of old models are deemed suitable for export to developing countries.

If it is considered feasible to redistribute among kolkhozes and sovkhozes tractors which have undergone one or two capital repair operations, then it is possible to recommend the rational use of tractors which are worn out to a greater degree. There are many small farms in need of tractors: rural schools, sanatoriums, hospitals, rest homes, resorts, resort and gardening cooperatives. The requirement of each small farm for tractors is not very great: 1-2 units; the annual use is also not very high. Nevertheless, the use of tractors on these small farms is effective, since they replace manual labor.

While the small farms require tractors, they are unable to employ the new and more powerful tractors efficiently nor can they afford them. The possibility of reselling obsolete tractors which have undergone a number of repair operations to small consumers would prevent an evil practice from developing at the sovkhozes and kolkhozes -- the premature writing off of tractors.

Moreover, some tractors for which the amortization period has expired but which still retain their qualities could undergo overhaul and also be resold to small consumers. They would be given a second life.

The introduction in the Soviet Union of a system for reselling second hand tractors and agricultural machines to second parties requires a system of well thought out economic measures.

Conclusions

The number of tractor models on the farms is excessive: more than the required number by a factor of 3.5-4. This is explained by a number of factors: the production of duplicate models; model changing by stages; continued production of machines which should have been removed from production (predecessors); irrational staffing of the tractor fleet; absence of the practice of redistributing the fleet among the farms.

The following principle should be implemented: one type and size -- one model in production. However, this may reduce the number of models by only 30 percent and produce an effect 8 years later. A radical and efficient alleviation of the multi-model problem in the tractor fleet on the farms cannot be realized through the efforts of industry alone.

A substantial and more rapid (2-3 years) reduction in the multi-model tractor problem on the farms is possible using two methods.

The first method consists of converting over to a scientifically sound system of supplying new model tractors to the farms on a mass basis, rather than distributing just 1-2 tractors to each farm.

The second method is inseparably linked to the first -- a systematic and rational redistribution of the existing fleet among the farms for the purpose of concentrating a lesser number of tractor models at each one of them. The most suitable arrangement is that of redistributing the machines after they have undergone capital repair work.

An expansion of the circle of interenterprise associations -- the owners of equipment and agroindustrial complexes -- will facilitate the proper staffing of the fleet and reduce its multi-model nature.

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PROBLEMS IN UTILIZATION OF NITROGEN FIXING BACTERIA IN UKRAINE

Kiev SIL'S'KI VISTI in Ukranian 9 Sep 80 p 2

[Article by V. Kalyta: "Nitrogen from the Air and Harvest; What is Restricting the Use of Bacterial Preparations"]

> [Text] Many years were spent by chemists in forcing the atmospheric nitrogen to combine with water to create ammonia--the basis for all nitrogen fertilizers, the most important essential for plant nourishment. Mineral fertilizer production is costly even today. Huge chemical combines must be built and must be equipped with expensive equipment.
>
> However, unseen natural combines of nitrogen fertilizer, of which we speak below, cannot be compared with the gigantic enterprises built by man. They are nitrogen fixing bacteria which settle on the roots of leguminous crops. They work on idle raw material--atmospheric nitrogen, which no agricultural crop can convert into a nutrient without the help of those micro-organisms.

Penetrating the pulse crop root system, the bacteria establish a biological symbiosis--a mutually convenient coexistence. The invisible combines obtain sugar and mineral compounds from the plant and provide it with nourishing, easily absorbed nitrogen substances instead. Thus, three-fourths of all bacteria produced nitrogen moves from the nitrogen fixing bacteria into the plant organism.

Soviet scientists-biologists made use of this capability. On the basis of active types of nitrogen fixing bacteria they created special preparations which intensify microorganism activity and strengthen the process of plant absorbed nitrogen accumulation in soil.

The head of the section on general and soil microbiology of the Institute of Microbiology and Virology imeni D.K. Zabolotnyy, Ukr SSR Academy of Sciences, doctor of biological sciences Kateryna Ivanivna Andriyuk demonstrates two soybean plants for us. The roots of one are covered thickly with colonies of light-grey bubbles. There were almost no such bubbles on the other.

"The first plant was grown in soil tilled with a highly active variant of nitrogen fixing bacteria," explains Kateryna Ivanivna. "The soybeans yielded a twenty percent higher harvest of green mass and beans and the bean protein content was markedly higher.

The microorganisms enrich the soil with nitrogen and are also beneficial to crops of lupine, clover, alfalfa and peas. For example, through their activity the green mass harvest of lupine, a high protein feed crop, increases by 30-40 quintals, by 2-3 quintals per hectare in grain crops. Still, the effectiveness of these invisible nitrogen accumulators is not used up. Billions of nitrogen fixing bacteria remain in the soil after harvest, they increase the harvest of following crops, enriching them with nutrients. Small wonder then that pulse crops are considered the best predecessor for all other crops.

But bacteria as well as plants and animals exhibit varied productivity. Those microorganisms which settle in the soil are not generally noted for an unusually high activity. It is the scientists' task to determine the most active and productive varieties which would be most successful in their task.

This is painstaking plant breeding work. Institute workers at the department of general and soil microbiology, especially the group dealing with nitrogen fixing bacteria headed by doctor of biological sciences Adelina Fedorivna Antypchuk, and wheat spike breeders are continuously selecting the most promising starting material for the next plant breeding on the bacteria's level. Later the useful invisibles' potential is studied in vegetative, field and production research as well as their "training." Many years are given to this work.

Candidate of Biological Sciences R. M. Kantselyarok was able to obtain a promising variety of nitrogen fixing bacteria through plant breeding which settle on the roots of yellow alkaloid-free lupine. The first thousand hectare portions of this preparation have been put into production. A scientific worker, V. M. Rangelova, is working on bacteria which settle on the roots of peas and clover. She has also worked on a series of active varieties of microorganisms which are being tested in many soil-climate zones of the country, showing high effectiveness.

Several highly active varieties of nitrogen fixing bacteria which promote a marked pulse crop harvest increase were raised at the Ukranian Scientific-Research Institute of Agriculture. Extensive research is being conducted there.

Scientific research is complicated because it must continuously renew the results. This work is fruitful only when a new variety of bacteria supercedes those varieties already put out by the microbiological industry in productivity.

Now about the advantages of preparations obtained through microorganisms, especially Rhizotorphine used in production. According to data from the Ukrainian Scientific Research Institute of Agricultural Microbiology, when nitrogen fixing bacteria of the preparation are present in the soil clover and alfalfa are able to accumulate during the vegetative period an average of 150-200 kg in available to plants nitrogen per each hectare and 50-60 kg per hectare for annual pulse crops. This is approximately the same as provided by a ton of nitrogen mineral fertilizer. But it is a free ton!

It is easy to calculate what a huge amount of additional agricultural production could be obtained by farmers if they could work together with the invisible partners tamed by scientists. In addition, this would be without work losses and expenses. Bacterial preparations need not be dispersed over the fields as, for example, organic or mineral fertilizer. It is enough to moisten the seed with a water solution. Scientific research has also determined the conditions for the most effective action of Rhizotorphine and recommendations have been prepared for its application under different pulse crops.

Is this substantial reserve for increasing the pulse corp harvest and the harvest of those crops which follow them in crop rotation fully utilized? How widely are bacterial preparations used over the republic's fields?

The information which we obtained at the Ukr SSR Ministry of Agriculture was not encouraging. The Ukr SSR Ministry of Sovkhozes is also doing little to spread this new idea. On the whole in the republic this year only 20 percent of the pulse crop area has been worked with Rhizotorphine.

Why is the preparation so underestimated? Are existing microbiological industry enterprises unable to satisfy rayon and oblast requests? We put this question to the chief director of the "Ukrbiokhimpreparat" association, M. M. Vyernyy.

"No, we could provide Rhizotorphine for the whole pulse crop area," states Mykola Maksymovych.

What is the problem then? It appears that there are too few requests in the association enterprises.

"Those farms which were convinced of the preparation's effectiveness, utilize it gladly," continues Mykola Maksymovych. "But, unfortunately, Rhizotorphine publicity has not been worked out adequately. It is not only our fault but also that of the interested ministries."

Not one gram of Rhizotorphine was ordered for increasing soil fertility by farms in Voroshilovgradskaya, Zaporozhskaya, Ivano-Frankovskaya, Nikolaevskaya and some other oblasts.

Whole scientific collectives are working on creating new, highly active varieties of useful microorganisms. The advantages of using them have been proved. For example, Rhizotorphine not only provides for an important harvest increase, but also increases the protein content in pulse seeds by 10-40 percent, by 2-6 percent in hay. One hectare portion of the preparation costs only 1 to 1.3 rubles, but the value of additional production obtained following its application is tens of times greater. This is only one easily visible advantage; what about the savings in many thousands of tons of nitrogen fertilizer so badly needed under other crops? And the after-effects of nitrogen fixing bacteria?

Interested ministries and departments, and especially "Ukrsil'hospkhimiya" should work out a preparation publicity program together with scientists and take an active part in putting the preparation into production. Unfortunately, no such interest has been seen to date. It cannot be considered as normal that the association "Ukrkhimbiopreparat" and its subordinate enterprises have no requests for preparing Rhizotorphine in the new five-year plan, and therefore cannot plan its production.

The republic's State Planning could show a little more efficiency here also.

A number of timely questions need to be answered; especially regarding the transportation to oblasts and rayons. Who should take care of this--the producing enterprise of this preparation or the local subdivisions of "Ukrsil'hospkhimiya"? Who should be responsible for storage and correct preparation utilization? It is no secret that some agricultural specialists are not familiar with the rules of its utilization. This, in turn, leads to the result that Rhizotorphine sometimes does not provide the expected results. But the preparation is not "at fault" in this case, but those who were entrusted with its introduction.

Scientists also come upon unsolved problems.

New bacteria varieties are tested by the All Union Institute of Soil Microbiology network over an extensive territory, and especially in those zones for which they were not meant. This takes up a lot of time--three to five years are spent on testing the effectiveness of proposed varieties. Scientists reasonably question why the approval system cannot be simplified, and worked out for the conditions of our republic, in the soil-climate conditions for which the preparations were created and meant. Experience has proved that microorganism varieties bred in the Ukraine often do not yield an appropriate effect in other distant zones.

Large scale research for the improvement of methods of bacterial preparation application needs to be coordinated and worked out. Life demands also an increase in their production, especially Rhizotorphine. This should be handled by interested departments, first of all Ukr SSR State Planning, "Ukrbiokhimpreparat" association, Ukr SSR Ministry of Agriculture, the Southern Section of VASHNIL and the Ukr SSR Academy of Sciences.

Widespread use of the live nitrogen fertilizer combines, as nitrogen fixing bacteria may be called, is not only one of the effective ways of increasing soil fertility, and improving its physical attributes (bacteria make it granular). It is also a savings in mineral fertilizers, always in short supply, and also a struggle for a clean environment. The problem is worthy of deep and large scale consideration. For this purpose the forces of scientific organizations and interested ministries and departments must be united and coordinated.

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FOLLOW-UP ON PROGRESS, PROBLEMS IN UTILIZATION OF NITROGEN FIXING BACTERIA

Kiev SIL'S'KI VISTI in Ukrainian 17 Dec 80 p 2

[Ukr SSR State Planning, Ukr SSR Ministry of Agriculture, Southern Section VASHNIL, "Ukrbiokhimpreparat" Association reply to 'SIL'S'KI VISTI' article "Nitrogen from the Air and Harvest"]

[Text] An article on the state and perspectives of using nitrogen-rich bacterial fertilizer on the republic's farms and on the problems which arose in the process of their wider application in production was printed by "SIL'S'KI VISTI" (No 207) under above title.

As reported by the chief of the agriculture department, Ukr SSR State Planning, V.Z. Makarenko, the article was discussed at the department with the participation of representatives from the republic's interested ministries and departments. Ukr SSR State Planning along with Ukr SSR Ministry of Agriculture are taking steps to fully supply farms with bacterial fertilizer. If in 1979 the scientifically recommended preparation Rhizotorphine was utilized over an area of 125 thousand hectares, this year it was used over 351 thousand hectares; in the following year it is planned to supply kolkhozes and sovkhozes with 608 thousand hectare portions.

The article was discussed also at the Ukr SSR Ministry of Agriculture and at the republican association "Ukrsil'hospkhimiya". O.T. Hulenko, Ukr SSR deputy minister of agriculture informed the editors that the problems mentioned in the article merit serious attention by agricultural organs. To introduce bacterial fertilizer more extensively, the "Ukrsil'hospkhimiya" association assigned special bases for their receipt and storage in the spring period. They will be shipped by "Ukrsil'hospkhimiya" transport. Interested departments are also working actively on preparation publicity, especially Rhizotorphine.

I. P. Proskura, deputy Presidium chairman, Southern Section of VASHNIL reports that the article was discussed at a meeting of the coordination-methods commission on problems in soil microbiology. It was noted that research on biological problems in nitrogen fixation continues actively at the Ukrainian Scientific-Research Institute of Agriculture; it has also been expanded at the Ukrainian Scientific-Research Institute of Agricultural Microbiology where a new laboratory of biological nitrogen was established. For new active varieties of nitrogen fixing bacteria of soybeans, lupine, peas and alfalfa were obtained at the first institute; compared to standard varieties, their use will provide for an increased seed harvest of 1.5-2.5 quintals per hectare. New varieties were tested and were recommended for industrial production of the preparation Nitragene. At the second of above institutes the most effective methods of utilizing Nitragene in Polissya were studied. Recommendations prepared on the basis of this research were included in the utilization plan for 1981.

Measures are used to expand the growing of new varieties of nitrogen fixing bacteria and the regionalization of Nitragene and other nitrogen fertilizer in the republic. For this purpose a wide network of appropriate field research will be established with a methods center at the Ukrainian Scientific-Research Institute of Agricultural Microbiology.

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